BLENDER TRICKS
Gleb Alexandrov reveals how to nail realistic lighting and materials

4GB OF FREE ASSETS
VIDEOS, MODELS & MORE

www.3DArtistonline.com

91

3DArtist™

Practical inspiration for the 3D community

INSTANTLY UPGRADE YOUR
MAYA SKILLS

- Improve today with pro insight
- Master the entire 3D pipeline
- Streamline your workflow

40 EXPERT TIPS
PAGE 22

CLARISSE EXPLORED
Get to grips with the powerful 3D tool used on Star Wars

+

- Lighting techniques
- ZBrush sculpting
- Redshift verdict
- Quixel textures

BUILD A PRO LEVEL PC FOR ONLY £2,000

WIN AN OSCAR
Plan, design and direct your own award winning animated short at home

ip IMAGINE PUBLISHING
DigitalEdition
GreatDigitalMags.com
ISSUE 091

IMAGE COURTESY OF EKATERINA PUSHKAROVA
ZBRUSH 4R7®
Pixologic
PIXOLOGIC.COM
THE ALL-IN-ONE DIGITAL SCULPTING SOLUTION.
DESIGNED FOR THE PURSUIT OF ART.
SCULPTED, TEXTURED AND RENDERED IN ZBRUSH

> Try to keep your triangle count at a minimum while still getting the most amount of detail out of it

Ben Erdt on making your geometry less expensive in Maya **Page 24**

Master new Maya skills today! Page 22

Ben Erdt
ben-erdt.de

Software Maya, ZBrush, MARI

Animate an award-winning short **Page 30**

Welcome

It's been absolutely ages since we sat down with a bunch of talented Maya artists and bugged them for tips, which is a shame as Maya has undergone quite the transformation over the last few years, especially through the introduction of Softimage (RIP) tools, Mudbox sculpting, XGen, Bïfrost and a better UI. Thankfully, we've remedied this and sapped an amazing collective of Maya pros of their considerable expertise to get you firing on all cylinders in Autodesk's flagship software.

Oscars season is upon us once again, and although the world will be shouting about the great feature film VFX moments of the year – in our case, *that* ILM bear scene in *The Revenant* – there will be, as always, a superb array of short animated pictures on show. Combine the Academy Awards with Annecy, Animago, the Annies and more, and there's a huge amount of platforms for you to show off your short film prowess. Find out from previous winners of major competitions all the key things you need to take into account when putting together your own award winner over on p30.

And if you're still hungry for knowledge, check out our pro tutorials in Blender, ZBrush, Clarisse and more, plus learn how to build your own workstation with the help of our expert guide. Enjoy the mag!

Steve Holmes, Editor

Sign up, share your art and chat to other artists at **www.3dartistonline.com**

Get in touch... 3dartist@imagine-publishing.co.uk @3DArtist Facebook.com/3DArtistMagazine

3DArtist

Imagine Publishing Ltd
Richmond House, 33 Richmond Hill
Bournemouth, Dorset BH2 6EZ
☎ +44 (0) 1202 586200
Web: www.imagine-publishing.co.uk
www.3dartistonline.com
www.greatdigitalmags.com

Magazine team

Editor Steve Holmes
stephen.holmes@imagine-publishing.co.uk
☎ 01202 586248
Editor in Chief Amy Squibb
Production Editor Carrie Mok
Senior Designer Newton Ribeiro de Oliveira
Photographer James Sheppard
Senior Art Editor Will Shum
Publishing Director Aaron Asadi
Head of Design Ross Andrews

Contributors
Gustavo Åhlén, Gleb Alexandrov, Orestis Bastounis, Paul Champion, James Clarke, Matthias Develtere, Rainer Duda, Paul Hatton, Emilio Hernández, Aldo Vicente, Poz Watson, Amaru Zeas

Advertising
Digital or printed media packs are available on request.
Head of Sales Hang Deretz ☎ 01202 586442
hang.deretz@imagine-publishing.co.uk
Account Manager Simon Hall ☎ 01202 586415
simon.hall@imagine-publishing.co.uk

FileSilo.co.uk
Assets and resource files for this magazine can be found on this website. Register now to unlock thousands of useful files.
Support: filesilohelp@imagine-publishing.co.uk

International
3D Artist is available for licensing. Contact the International department to discuss partnership opportunities.
Head of International Licensing Cathy Blackman
☎ +44 (0) 1202 586401
licensing@imagine-publishing.co.uk

Subscriptions
To order a subscription to **3D Artist**:
☎ UK 0844 249 0472
☎ Overseas +44 (0) 1795 592951
Email: 3dartist@servicehelpline.co.uk
6-issue subscription (UK) – £21.60
13-issue subscription (UK) – £62.40
13-issue subscription (Europe) – £70
13-issue subscription (ROW) – £80

Circulation
Head of Circulation Darren Pearce ☎ 01202 586200

Production
Production Director Jane Hawkins ☎ 01202 586200

Finance
Finance Director Marco Peroni

Founder
Group Managing Director Damian Butt

Printing & Distribution
Printed by William Gibbons & Sons Ltd, 26 Planetary Road, Willenhall, West Midlands, WV13 3XT

Distributed in the UK, Eire & the Rest of the World by Marketforce, 5 Churchill Place, Canary Wharf, London E14 5HU
☎ 0203 787 9060, www.marketforce.co.uk

Distributed in Australia by Network Services (a division of Bauer Media Group), Level 21 Civic Tower, 66-68 Goulburn Street, Sydney, New South Wales 2000, Australia ☎ +61 2 8667 5288

Disclaimer
The publisher cannot accept responsibility for any unsolicited material lost or damaged in the post. All text and layout is the copyright of Imagine Publishing Ltd. Nothing in this magazine may be reproduced in whole or part without the written permission of the publisher. All copyrights are recognised and used specifically for the purpose of criticism and review. Although the magazine has endeavoured to ensure all information is correct at time of print, prices and availability may change. This magazine is fully independent and not affiliated in any way with the companies mentioned herein. If you submit material to Imagine Publishing via post, email, social network or any other means, you automatically grant Imagine Publishing an irrevocable, perpetual, royalty-free license to use the material across its entire portfolio, in print, online and digital, and to deliver the material to existing and future clients, including but not limited to international licensees for reproduction in international, licensed editions of Imagine products. Any material you submit is sent at your risk and, although every care is taken, neither Imagine Publishing nor its employees, agents or subcontractors shall be liable for the loss or damage.

© Imagine Publishing Ltd 2016

ISSN 1759-9636

recycle
When you have finished with this magazine please recycle it

OVERCLOCKERS UK

RENDA

PROFESSIONAL WORKSTATIONS

5 YEAR WARRANTY • BUILT & STRESS TESTED • CONFIGURABLE • ENGINEERED BY THE EXPERTS

WWW.OVERCLOCKERS.CO.UK/**RENDA**

IDEA • DESIGN • **RENDA**

Featuring watercooled overclocked workstations

The Expert Panel

This issue's team of pro artists...

ALDO VICENTE
AldoVicenteCG.com

It's great to have Aldo back in **3D Artist**, as his command of Maya and other tools can be quite breathtaking. This issue, he's here to help you master backplate integration, rendering and compositing.
3DArtist username AldoVicenteCG

GLEB ALEXANDROV
creativeshrimp.com

One of the Blender community's most active individuals, Gleb is a true master of his craft. Over on p54, discover his unique and fun approach to lighting a night city scene based on Seoul.
3DArtist username Gleb Alexandrov

RAINER DUDA
rainer-d.de

We don't get to feature Clarisse as much as we'd like to, so we asked Rainer to put together a great subsurface scattering workflow for you to try. If Clarisse is good enough for ILM, it's good enough for us!
3DArtist username Rainerd

GUSTAVO ÅHLÉN
facebook.com/gustavoahlenstudio

It sounds simple, but creating terrain and environmental models like rock formations requires care if you're after a realistic result. On p66, Gustavo gets into the nitty gritty in 3ds Max and ZBrush.
3DArtist username gustavoahlen

MATTHIAS DEVELTERE
develteremattias.wordpress.com

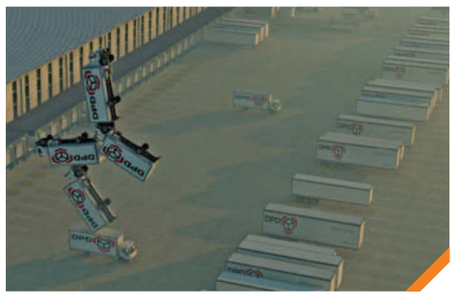
Matthias has a really recognisable style and works for an awesome game developer, so we were more than happy to invite him back this month. On p70 he busts out Quixel SUITE.
3DArtist username MattDev

AMARU ZEAS
amaruzeas3d.com

We see so many arch-vis scenes where the lighting isn't quite right – it can be difficult to achieve a realistic result. Amaru shows you how, with some tinkering, you can nail interior renders.
3DArtist username amaruzeas

EMILIO HERNANDEZ
e-roja.com

We seem to hear of more professional studios adopting GPU renderer Redshift every day, so it was past time we put it under the microscope. On p80, Emilio discovers what all the fuss is about.
3DArtist username n/a



PAUL HATTON
cadesignservices.co.uk

V-Ray and 3ds Max fit together beautifully; they are a popular combination, especially in the arch-vis world. On p82, Paul puts V-Ray 3.3 for 3ds Max through its paces.
3DArtist username n/a

ORESTIS BASTOUNIS
twitter.com/MrBastounis

Poor Orestis. As if his house wasn't already horribly full of components, we made him build an entire 3D workstation from scratch this month. Head over to p38 to find out how he got on.
3DArtist username n/a

3D rendering?
There's fast, then there's fast.

intel inside CORE i7

PC PRO TECH Excellence AWARDS 2015 Chillblast Desktop PCs

Fusion Render OC M4000
From £2499.99

For full specs please visit:
www.chillblast.com/RenderM4000

Blazingly quick performance backed up by award winning customer service and 5 year warranty.

Chillblast

www.chillblast.com/RenderM4000
01202057275

Intel, the Intel Logo, Intel Inside, Intel Core, Core Inside, are trademarks of Intel Corporation in the U.S. and/or other countries.
Prices are correct at time of going to press (01-02-16) E&OE

Contents

What's in the magazine and where

News, reviews & features

10 The Gallery
A hand-picked collection of incredible artwork to inspire you

22 Master new Maya skills today
Power up Maya and discover the tips and tricks you need to be using

30 Animate an award-winning short
Prize winners tell all about what it takes to create a short, and the secrets to winning

38 Build your own 3D workstation for £2,000
Orestis Bastounis reveals the core components you need to build your own 3D workstation

44 Technique Focus: The Jaguar D-Type
Award-winning studio INK reveals how it revved up its detailing

77 Technique Focus: Special OPS
Milton Dias explains how he used splines to create realistic fur for a cartoon mouse

78 Subscribe Today!
Save money and never miss an issue by snapping up a subscription

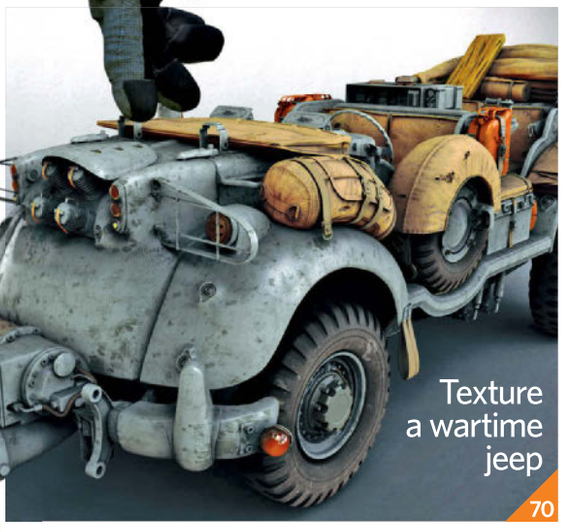
80 Review: Redshift
Emilio Hernández puts the renderer through its paces with everything in his arsenal, but will Redshift come out on top?

82 Review: V-Ray 3.3 for 3ds Max
Paul Hatton tests the speed improvements for V-Ray 3's third iteration

"Based on our backplate, we can figure out where the sun should be in relation to our focal point"

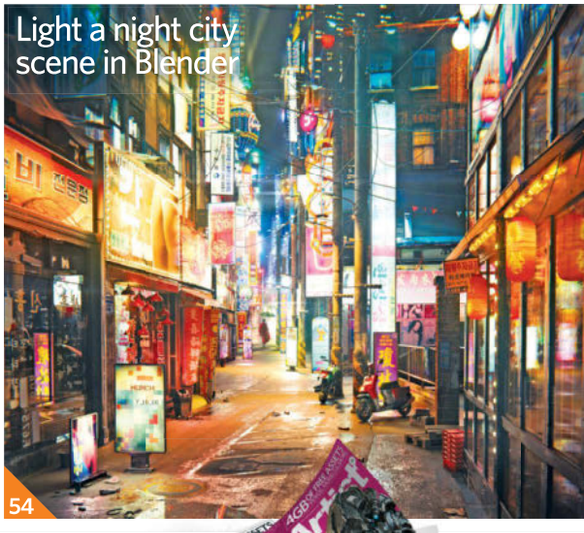
Aldo Vicente on working with HDR backplate reflections **Page 49**

46



Texture a wartime jeep

70



Light a night city scene in Blender

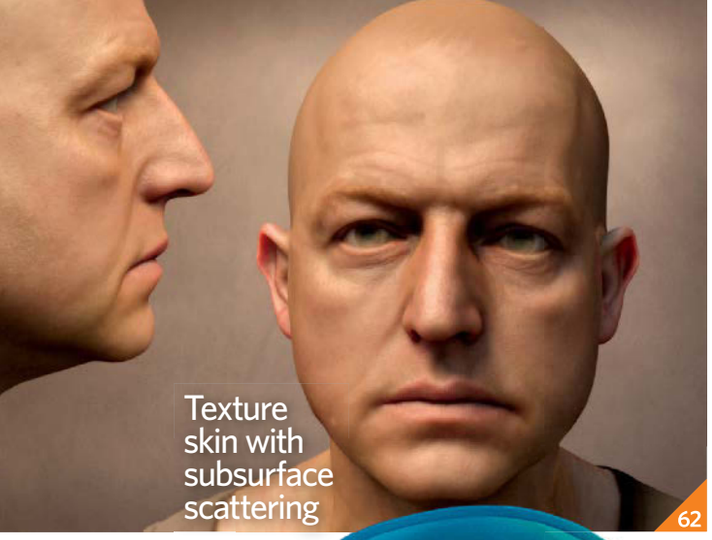
54

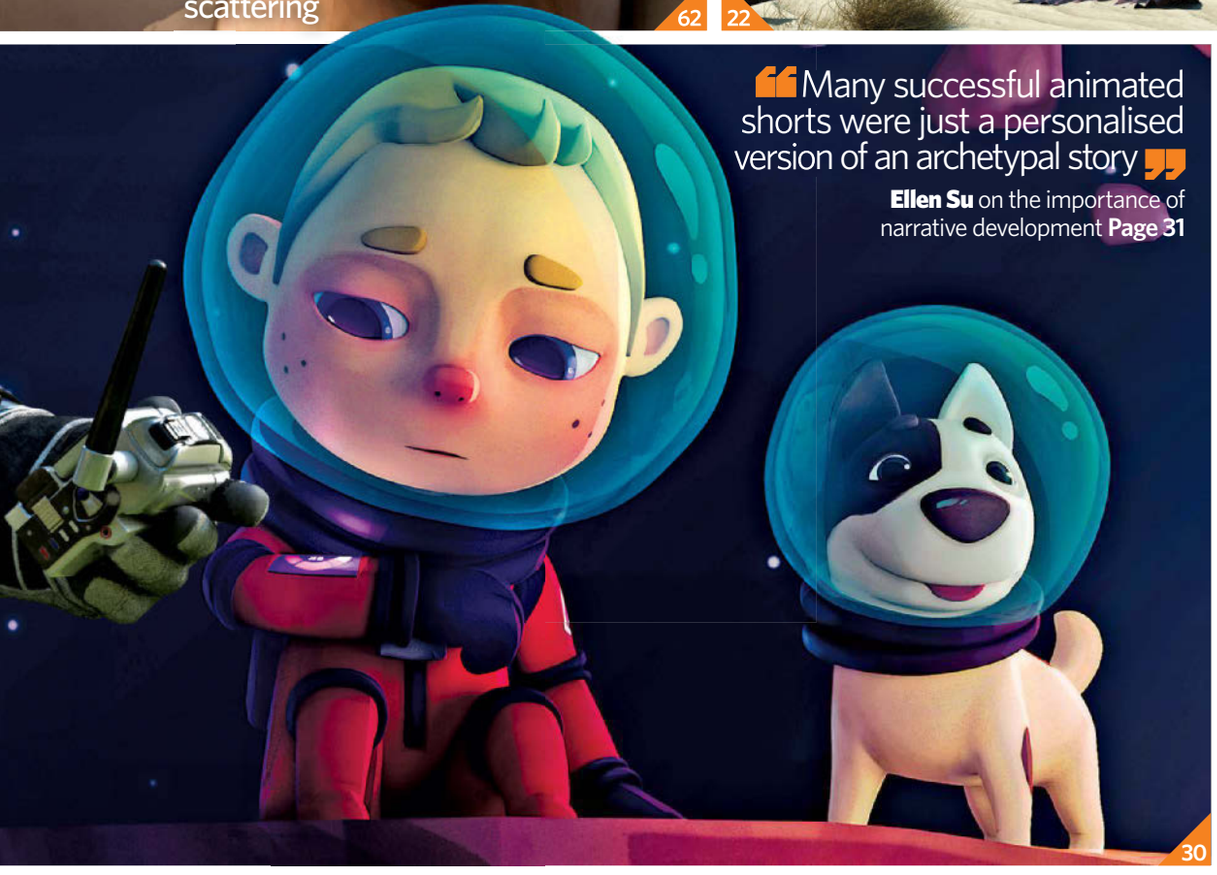
Build your own PC

38

SAVE 50%
SUBSCRIBE TODAY

Turn to page 78 for details




“Many successful animated shorts were just a personalised version of an archetypal story”
Ellen Su on the importance of narrative development Page 31
30

The Pipeline

46 Step by step: Master backplate integration
Aldo Vicente reveals how to utilise backplates for an astronaut scene

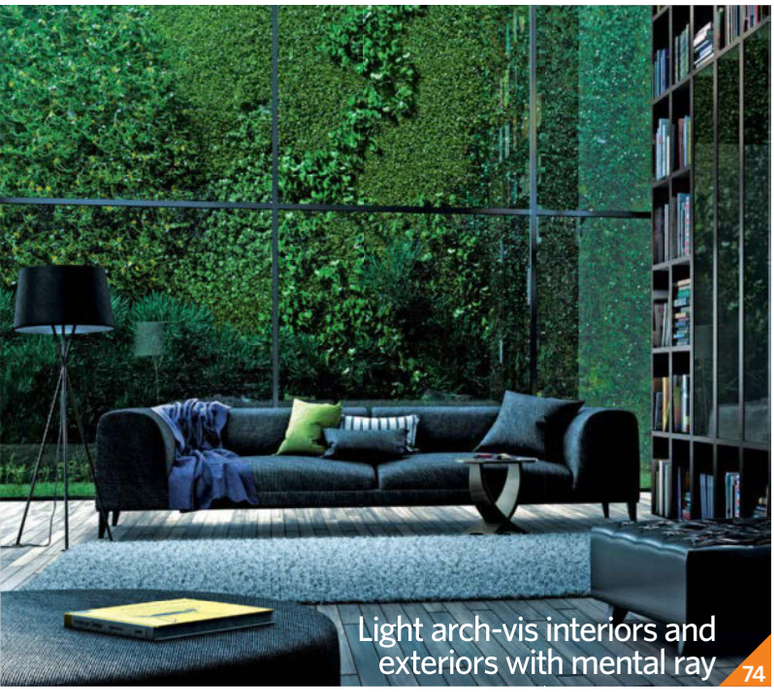
54 Step by step: Light a night city scene in Blender
Gleb Alexandrov teaches you how to transform urban environments with the help of glossy surfaces

62 Pipeline techniques: Texture skin with subsurface scattering
Discover Clarisse techniques for impressive human skin

66 Pipeline techniques: Sculpt and detail realistic rocks
Upgrade rock formations by utilising 3ds Max modifiers

70 Pipeline techniques: Texture a wartime jeep
Matthias Develtere divulges the process behind texturing his stunning high-poly vehicle model

74 Pipeline techniques: Light arch-vis interiors and exteriors
Amaru Zeas provides expert tips in mental ray with camera lens nodes



DOWNLOAD FROM THE FileSilo

- Premium HDR maps courtesy of CGAxis
- Three CGAxis food models
- 25 textures from 3DTotal
- A huge selection of images, video tutorials and scene files from our tutorials

Turn to **page 96** for the complete list of this issue's **free downloads**
filesilo.co.uk/3dartist

Visit the **3D Artist** online shop at
imagineshop.co.uk
for back issues, books and merchandise

The Hub

86 Community news
The Rookies kicks off for the first time, from the founders of the CG Student Awards

88 Industry news
Storyboard Pro gets a new version and Maxon considers an overhaul of its licensing

90 Studio Access: Centroid
The mocap studio behind *Until Dawn* gets excited about the next generation of motion capture

94 Readers' gallery
Community art showcase

The Gallery

Have an image you feel passionate about? Get your artwork featured in these pages
Create your gallery today at **www.3dartistonline.com**

Lorett Foth
lorettfoth.com

Lorett originally studied industrial design, but now specialises in 3D visualisation

Software 3ds Max, ZBrush, Hair Farm, Photoshop, V-Ray

Work in progress...

"I was working on a job where I needed to create hair, so I started learning Hair Farm. Unfortunately, time is always limited while working with clients, so I decided to do the squirrel as a personal project shortly after. The aim was to see how far I can push it to make it as realistic as possible"

Lorett Foth, *Squirrel,* 2015

> This artwork was my first entry for the Sculpt January competition, run by Zacharias Reinhardt, in which there has to be one model made each day throughout January 2016. My goal was to make every entry solely in Blender

Julien Kaspar,
Day 1 – Mushroom, 2016

Julien Kaspar
on.fb.me/1UXOvnH

Julien is 20 years old and is doing an apprenticeship at the Liga 01 Computerfilm studio

Software Blender

Work in progress...

Alireza Akhbari
alireza-akhbari.com

Alireza was born in 1987 and he has been working as a generalist for over a decade

Software 3ds Max, Mudbox, ZBrush, Photoshop

Work in progress...

"I read a book about Nader Shah (a famous Persian king)and how influential his personality was. After that I made a decision to make this model to pay tribute to him"

Alireza Akhbari, *Nader Shah,* 2015

> The aim of this personal project was to create a very minimal interior, which would feel inviting and have a sense of serenity to it. Since it's a study about mood, a lot of effort was put into getting the colours, the shapes and the lighting to work in harmony and to give a certain calm winter charm to the space

Ville Riikonen,
Winter Interior, 2015

Ville Riikonen
voimagraphics.fi

Architect by training and 3D artist by passion, Ville is the founder of Voima Graphics

Software 3ds Max, V-Ray, Photoshop

Work in progress...

Marcus Whinney
marcuswhinney.co.uk

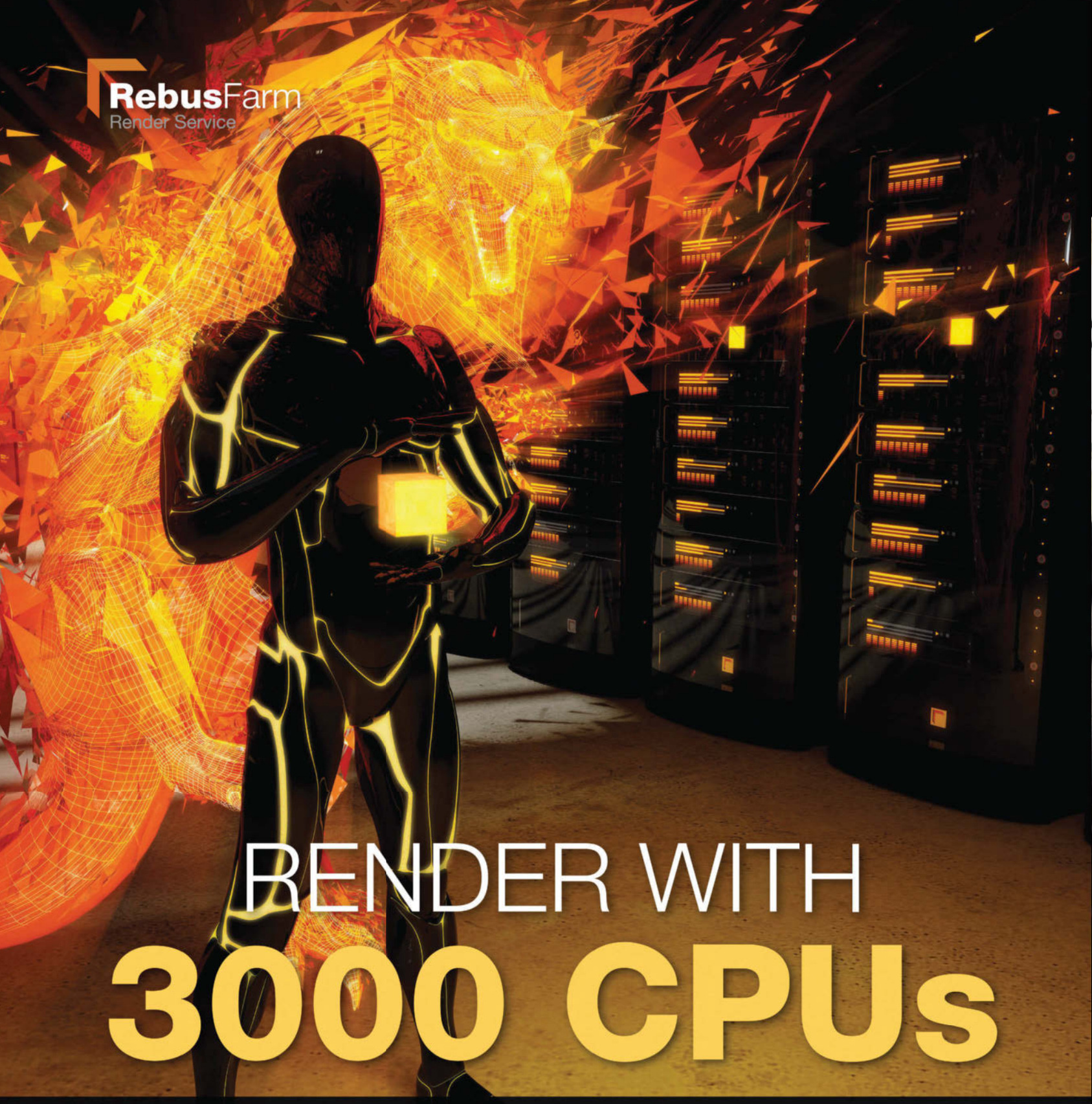
A freelance character artist and animator, Marcus is currently based in England

Software ZBrush, Maya, KeyShot, Photoshop

Alternate render...

"This is a personal project done in my spare time. For this character concept I wanted to show a troll in a different light"

Marcus Whinney, *Beauty in Ugly,* 2015



Making your deadline in time was never cheaper, easier and faster than now. Unleash the power of **3000 CPUs** right into your desktop.*If you are new to our cloud rendering service feel free to use this coupon code **3DA-RE-3RF91VQ** to receive **35 Renderpoints worth 35 €**. Download our advanced RebusFarm software, send some test frames and find out for yourself how fast and easily it works. The RebusFarm Renderservice is processing 24/7.

www.RebusFarm.net

RebusFarm
Render Service

3D ARTIST

My name is **Sergiu Zboras**, I am a CG artist from Moldova, currently working at Brick Visual. I want to present to you one of my award-winning images. The scene's name is "Thonet Atelier". I tried to picture a small old style workshop where these Thonet chairs were crafted. This scene was created in 3ds Max and rendered with Corona, with some minor postproduction in Photoshop. The image was created during Dream Class contest organized by DesignConnected. While modeling and preparing the scene I ran out of time to render it, so RebusFarm was my life saver and I was able to render it very quickly and be in time, pushing my way to be among the winners of that contest. This picture also won Ronen Bekerman Blog 6th Birthday image contest.

Portfolio: **http://be.net/ZB-Vision**

35€* FREE TRIAL
3DA-RE-3RF91VQ

Elena Valeria Nedelcu
www.evnvis.co.uk

Coming from a fine arts background, Elena is a 3D artist and creative

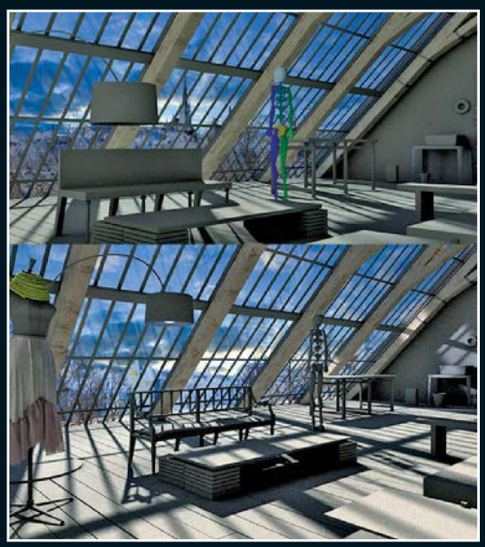
Software 3ds Max, Corona, ZBrush, Marvelous Designer

Work in progress...

“Ballerina Loft was created for the Evermotion Whola Lotta Loft! Challenge. I was inspired by an interior design editorial and developed my own concept and story around the idea that a ballerina lives in this space, with the goal of letting the viewer feel her presence in the room”

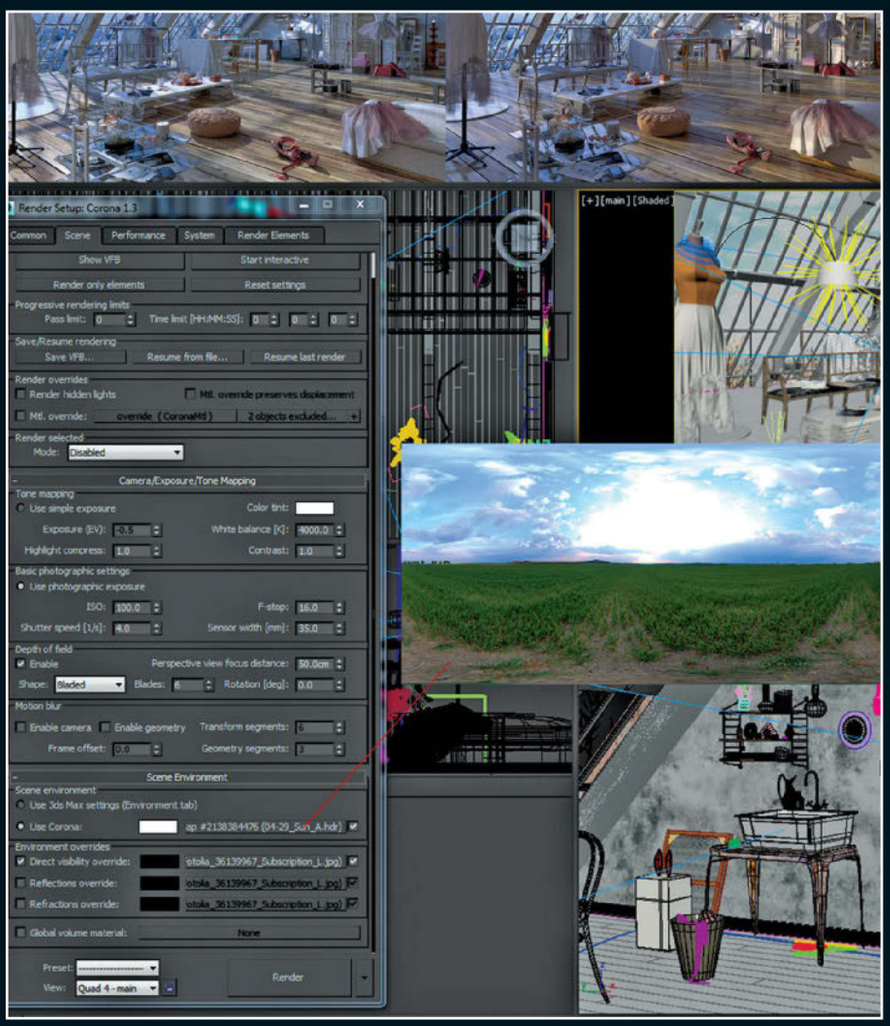
Elena Valeria Nedelcu, *Ballerina Loft,* 2016

> I used Marvelous Designer for creating the cloth simulations, and although I have used this software many times before, making dresses and skirts was a new experience for me. It was really fun but equally challenging
>
> **Elena Valeria Nedelcu,** *Ballerina Loft,* 2016

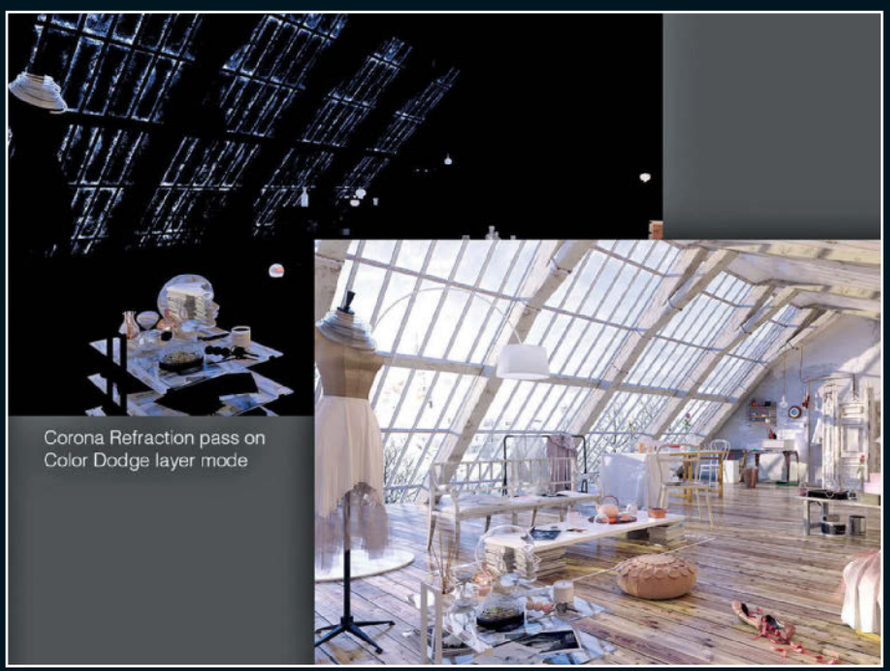


CONCEPT/MODELLING
ABOVE I started with the light and camera setup while modelling blockouts of the objects I wanted to show in the scene. I wanted to give the space a natural look so I experimented with lighting and texturing – especially colour wise. I aimed for a harmony of colours like in a painting (which is actually my undergraduate degree).

LIGHTING SETUP
ABOVE Lighting was the most engaging and challenging aspect of this piece. I changed it dozens of times over the course of the project (trying lots of different HDR images and settings). I kept changing it until I had a result that I was finally satisfied with.



RENDERING
ABOVE I used Corona as my render engine and it was a 'learn-as-you-go' situation. This was only my second project using Corona rather than with V-Ray so I needed to learn a lot about settings, lighting and materials while experimenting with my image.



POST-PRODUCTION
ABOVE I made minimal changes to the colour balance and curves, and I also used the Corona refraction pass set to Color Dodge mode with a diffuse filter on the light coming from the windows. Then at the end I added a touch of a Knoll Light Factory filter just to point out just how blinding the wintery light can be.

24/7 support

GarageFarm.NET

GarageFarm.NET is a render farm made by 3D artists for 3D artists.

As 3D professionals, we understand the biggest problems in 3D rendering:

Rendering is a long process and can be unpredictably time consuming and on occasions, frustrating.

Buying or renting nodes is expensive, but commercial render farms are not cheap either.

Preparing scenes and uploading files can be bothersome and time consuming.

We have over 300 energy efficient nodes and an in house developed software package.

We created software that allows sending files with one click directly from your 3D app to our farm. It's user-friendly and quick.

We offer three different priority packages. With the highest priority you get ahead of the queue to render faster. With the lowest priority the rendering might take a bit longer, but you will get the best deal possible.

Autodesk 3ds Max, Autodesk Maya, The Foundry MODO, NewTek LightWave, E-On Vue, Softimage, Blender, NVidia CUDA, Planetside Terragen

Skype garage.farm
KakaoTalk: garagefarm
NateOn: garagefarm@nate.com
Line ID: garagefarm.net

Korea – 00 82 109 511 8937
US – 00 1 424 777 2424
UK – 00 44 208 144 7772

garage@garagefarm.net

http://www.GarageFarm.NET
https://garage.farm/forum/

Free Rendering! Coupon Code: MAG 01

Coupon Code: MAG 01
For mentioning this coupon code while registering for a Cloud Account on our website we will offer **double free credits** valid for a **free rendering** test. This is a great way to "try before you buy" without commitment.

All trademarks and registered trademarks are the property of their respective owners.

MASTER NEW MAYA SKILLS TODAY

Get the most out of Maya and learn new techniques right now with these essential tips and tricks

Like a fine wine, Maya has aged well over the years, and none more so than the last few which have seen the inclusion of a host of significant new features, including Bifröst, XGen, Mudbox sculpting tools, Grease Pencil and much, much more.

What follows on from a series of strong new releases are new workflows and techniques to push the envelope of what's possible in terms of performance, ease of use and artistic innovation.

To help artists do what they do best, **3D Artist** has gathered together a definitive list of tips so you can stay on top of your Maya game and master all of its tools – some of which you may not have heard of and others that you may have been aware of but have not yet gotten to grips with.

Over the next few pages you'll find modelling tips from Jeanne Lin; rigging and nCloth advice from Andrea Goh; Molly Meyer shares her lighting and rendering know-how; Ben Erdt teaches us the importance of clean, less expensive geometry; Simon Payne divulges how to thread a rig, Rachel Davidowitz provides her wisdom for working with Bifröst; animation shortcuts from Taran Matharu, XGen guru Michael Todd helps you with hair, Amaru Zeas teaches you to work with photons; and Alexandr Novitskiy provides a step-by-step overview, explaining how he created his stunning desert buggy.

EXPERTS

Rachel Davidowitz
racheldavidowitz.com
Freelance scientific animator

Ben Erdt
benerdt.artstation.com
Character artist at Guerrilla Games

Andrea Goh
andreagoh.com
Freelance Character TD

Jeanne Lin
jeannelin.com
Freelance 3D artist

Taran Matharu
taranmatharu.com
Senior animator at Mikros Image Canada

Molly Meyer
mollymeyer.me
Student at University of Texas

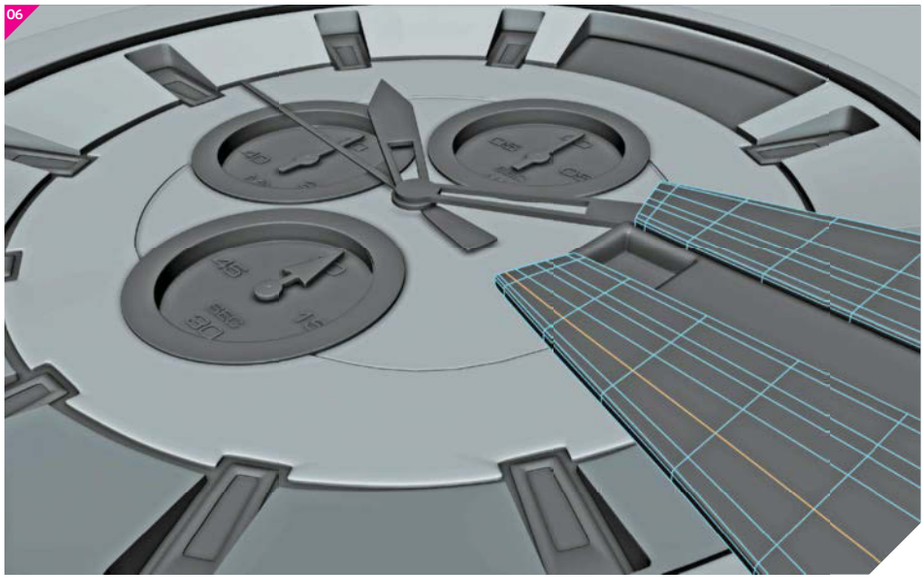
Alexandr Novitskiy
behance.net/Tigersfather
Modelling instructor at CGTarian

Simon Payne
criteriongames.com
Senior Rigger at Criterion Games UK

Michael Todd
autodesk.com
User experience designer at Autodesk

Amaru Zeas
amaruzeas3d.com
Senior 3D artist at Ten Gun Design

MODELLING & TEXTURING



01 **Modelling with the Multi-Cut tool** A very useful modelling tool worth learning is the Multi-Cut tool, which is a part of the Modeling Toolkit. It enables you to control your edge flow whether you want to create an edge loop or cut along a surface free hand. Using the Q key deactivates the tool when you want to rotate around your model in the viewport. Hit the Y key to activate the tool again. **Jeanne Lin**

02 **Use the Sculpting shelf** I was happy to see that Maya 2016 integrated many brushes from Mudbox, which definitely opened more possibilities for projects that require sculpting. I used to export my models into another program to sculpt details but now I can travel less and stay inside one program. You can adjust parameters inside the tool setting, such as the brush Strength and Size, as well as enable Maya's built-in Smooth Mesh mode, making the process feel more organic. **Jeanne Lin**

03 **Local symmetry with groups** When modelling armour (eg a shoulder pad) I like to work on it while it's at its final position. To work in symmetry create new geometry (like a cube) in the world centre first. Create an instanced mirror and group both meshes. Move the group into the position of the armour piece. Moving one of the meshes now in Component Mode they will still be symmetrically edited. **Ben Erdt**

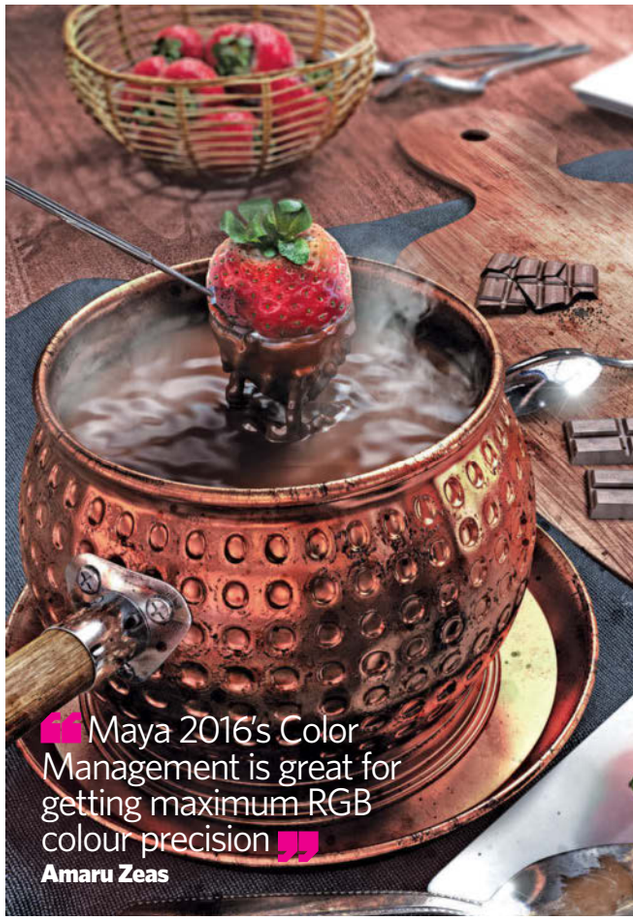
04 **Convert n-sided to quads** If you suddenly encounter an n-gon and you have no idea how to keep it as a quad, there is a great tool to help with that. It automates the process of converting n-sided faces into quads. Once the n-gon is solved you can simply use the Spin Edge (this is available in Bonus Tools) to satisfy the edge flow that you need to achieve. If you don't have Bonus Tools installed yet, get it from **area.autodesk.com/downloads**. **Jeanne Lin**

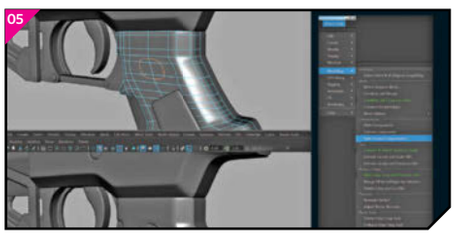
05 **Split around Components Tool** There's no need to manually draw a path around your target component when there is a Split tool in Bonus Tools – it will do it all for you with just one click. Sometimes I use this to make a hole in a surface in order to attach another mesh to the original model, or even make a hole and extrude those faces out to get my desired look. It's an awesome tool to have under your belt. **Jeanne Lin**

06 **To Edge Ring and Split** One of the greatest time-savers in Maya is the integrated marking menu which I rely on all the time. One of my favourites is the To Edge Ring and Split tool, which enables you to make edge loops down the centre of models. It's much easier than trying to find the tool in the extensive menus. Access it quicker by using Ctrl/Cmd+RMB>Edge Ring Utilities>To Edge Ring and Split. **Jeanne Lin**

07 **Keep your geometry clean** Whenever you are working on a mesh that is going to be used for animation and rendering keep your geometry as clean as possible. Spending that extra time to do this will save you some more time once it comes to animation, texturing and rendering. Ensure you have clean and efficient line flow, as well as polygon density, to stick with quad polygon. This will avoid nasty triangles or n-gons, which can become a problem during deformation. **Ben Erdt**

08 **Retopology with Quad Draw** I find using Quad Draw to retopologise my models essential. It is a common step to perform when the polycount is too high and you need to edit your edge flow. First, select your model and click on the magnet icon to make it a live surface. Select the Quad Draw from the Modeling Toolkit and begin plotting vertices on your model. Hold Shift+LMB over four points to consolidate the faces drawn on the surface. **Jeanne Lin**

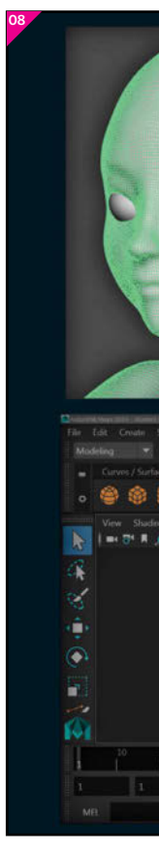


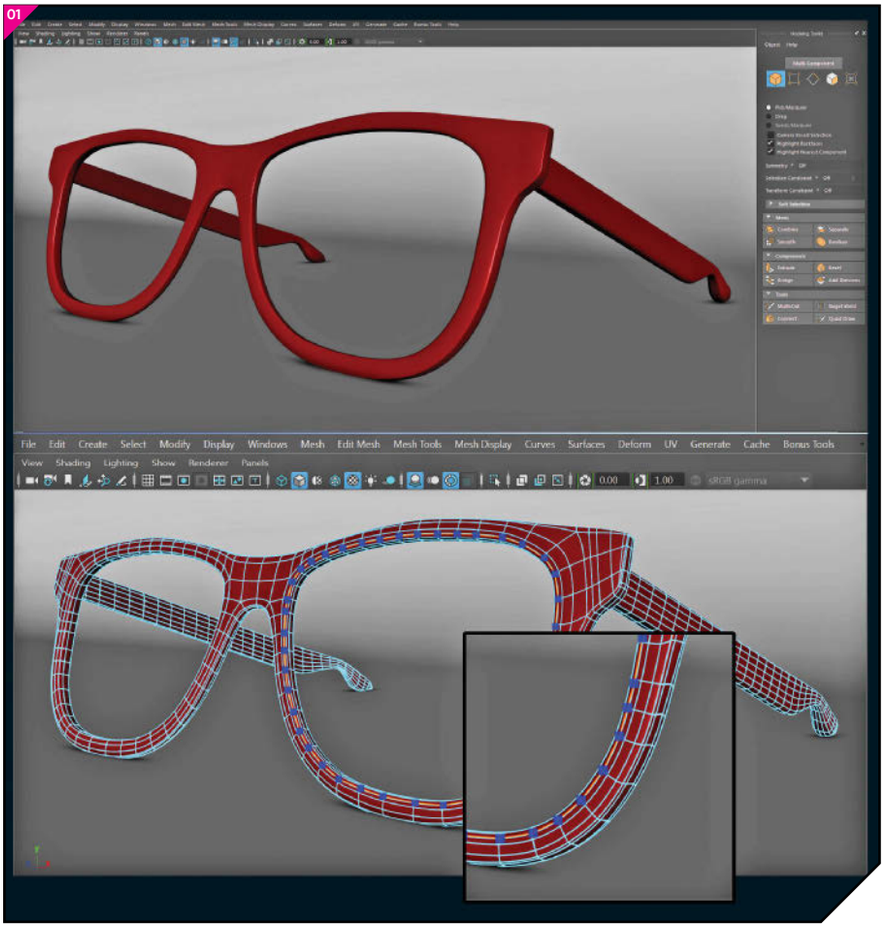


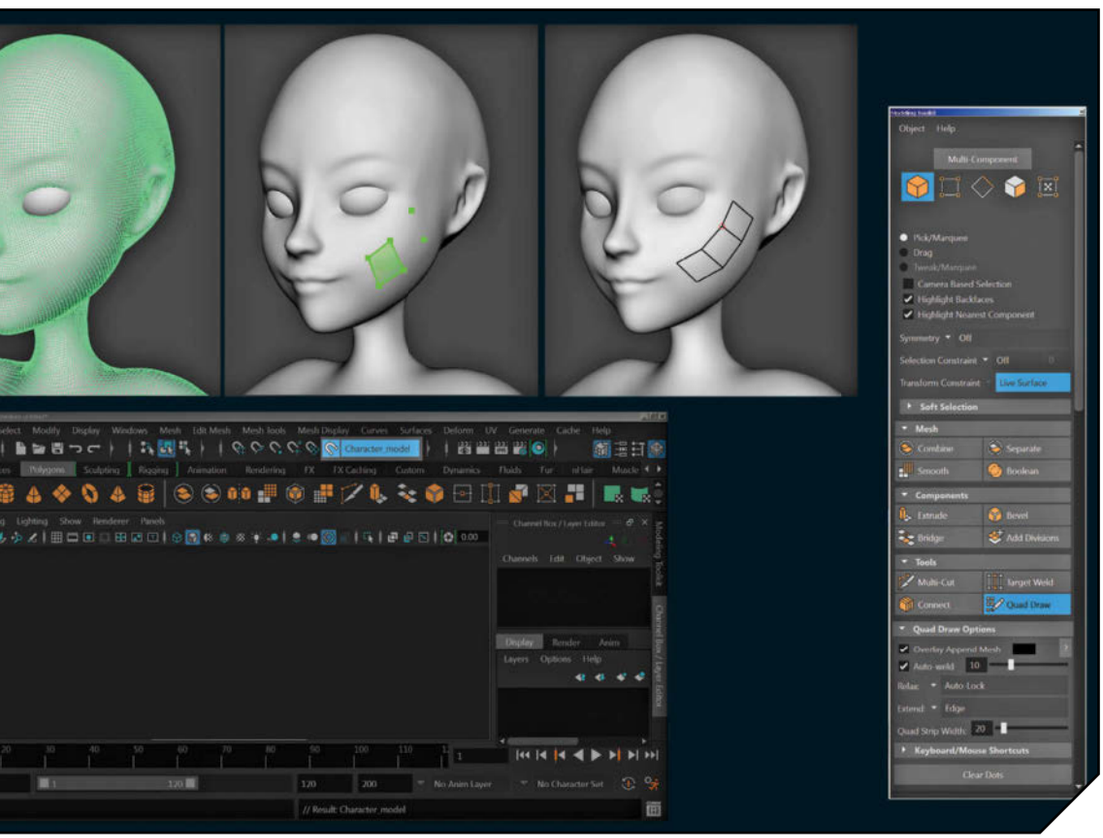
09 **Less polygons, more detail** To keep your geometry less expensive try to keep your triangle count at a minimum while still getting the most amount of detail out of it. Use edge loops as efficiently as you possibly can and avoid any extra polygons that increase the overall density without affecting the shapes. **Ben Erdt**

10 **Preserve UVs with Slide Edge Loop** This is one of my favourite tools in Maya's Bonus Tools. I can easily slide my edge loops along the surface of my model, while maintaining the shape of my model and preserving the UVs so they don't get stretched or distorted. First select your component and go into Modeling>Bonus Tools>Modeling>Slide Edge Loop Preserving UVs or in the marking menu with Shift+RMB>Bonus Tools. **Jeanne Lin**

11 **Color Management tool** Maya 2016's Color Management is great for getting maximum RGB colour precision for textures. **Amaru Zeas**



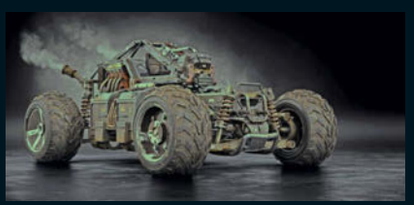




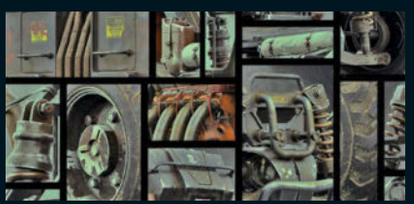
THE PRO MAYA TO V-RAY PIPELINE

Alexandr Novitskiy explains the steps he takes in creating an off-road dune buggy

01 **Everything is important** Good geometry is an important first step in achieving a beautiful picture. I always try to focus on detail and not to forget about the correct topology. This is also important for further unwrapping and texturing.



02 **Materials** Sometimes the best way to achieve a good result is to follow artistic principles, but sometimes you can use real material values on your shaders. For help with transparent materials, you can use a table from vray.info/topics/t0076.asp.



03 **Lighting** The best way to simulate desert heat is to use the physical simulation of the Sun. A full 3D environment helped me to achieve this. For an artistic effect with intensified speculars I used an HDRI on VrayDomeLight with additional light sources.

04 **Colour correction** In Photoshop I added a small amount of cross-processing effects for an 'old photo' feeling. For studio renders I rendered an additional HDRI pass with speculars using Screen in Photoshop.

RIGGING & ANIMATION

12 **Thread your rig with Parallel Rig Evaluation** Assign your whole rig to a display layer of its own. From Maya 2016 the display layers are able to multithread across all available cores in parallel, this is depicted by the new column in the layer editor and the checked box showing a P. You have control over Parallel or Serial evaluation in the Animation rollout under Settings in Preferences. This has an additional option for GPU override, which Viewport 2.0 takes advantage of to accelerate hardware performance further. **Simon Payne**

13 **Use Blend Shape to organise paint weights** Have a duplicated face mesh of the character that you are rigging, and only build your face rig on it as a Blend Shape. Leave your original rig mesh consisting of only basic weightings of the jaw and neck, and have the facial weights on the Blend Shape mesh. This can be applied to any rigs that require layers of weighting and deformation. **Andrea Goh**

14 **Anatomical joint placements** Having joint placement closer to realistic anatomy improves deformation, with exceptions. Spine joints and elbow joints are better placed a little closer to the skin surfaces instead of being placed dead centre. This helps create the rolling deformation of the skin on the opposite side when the joint is rotated. **Andrea Goh**

15 **Unweighted Auto Tangents** If you want to get more accurate interpolations/ in-betweens when setting keyframes, untick Weighted Tangents in the Animation Preferences menu. Using Weighted Tangents will make it much more tedious to edit the curves when desired. **Taran Matharu**

16 **GPU accelerate your geometry** Set a display type switch on your rig somewhere that switches visibility of your main geometry group off and switches another on. In this display mode use a group that contains Alembic GPU nodes and not real geometry. To do this, select all of your normally cut-up geometry and Alembic cache it out via Maya's pipeline cache. Then call it back in on an Alembic node. At present, the Maya Alembic plugin does not support shader assignment or textures on GPU objects. If you want colour on your GPU objects, use a coloured ambient or a directional light that does not affect anything else. **Simon Payne**

17 **Use Grease Pencil** The Grease Pencil is a very useful tool for drawovers in any Viewport. It has the powerful 'onion skinning', feature which stores the previous and forthcoming drawover frame in action. The tool is also especially useful for analysing lines of action, posing and overlaps. **Taran Matharu**

18 **Middle-click keyframing** When creating two key poses, for example, a key at frame 0 and another at frame 10, you may want to hit the interpolated frame 9 (could be linear or ease-in/ ease-out) much earlier, say at frame 5. First go to frame 9, then middle-click in the Timeline to frame 5 and then hit S. This will put the interpolated value at frame 9 to frame 5. This is great for key and hold posing. **Taran Matharu**

19 **Expressions Over Set Driven Keys (SDK)** Unless you have multiple connections on an attribute, use expressions to set your attribute driving values. It is more flexible, editable and reuseable for other attributes just by copying and pasting the lines with some changes in names. As compared to SDK, any value fixes require redoing the process of setting driven and driving values. It is also not reuseable for other attributes. **Andrea Goh**

20 **Add Stickiness to a rigid body** When dealing with a character that twirls or spins, the nCloth on it tends to roll up or gather up. A trick to avoid this is by adding a small value like 0.1 to the Stickiness of the character's rigid body, so that the nCloth will stick on it very slightly and enough to keep it from rolling up. **Andrea Goh**

21 **Animate a nucleus for unbroken simulation** When a character in clothes moves too fast, nCloth tends to break due to its calculation from where the nucleus is placed. Connect or animate the nCloth's nucleus to the character's moving mesh to avoid broken simulations. **Andrea Goh**

22 **Scene size consideration** If you're used to modelling using Maya's default cm units and you are new to Bifröst, you should note that Bifröst works exclusively in metres. One working unit in Maya is equivalent to one metre for Bifröst, regardless of the units currently set in Maya. I find making objects slightly larger than 'reality' creates more impressive splashes. **Andrea Goh**

23 **Fix collision detection issues** Liquid loss through colliders may occur in certain simulations. To avoid this happening, model collision objects as thick as possible or increase thickness under the Collision tab of the shape attribute, decrease the master voxel size and/or adjust the Transport Step Adaptivity and Master Transport Steps. If modelling a thin cup for example, a thicker collider that's hidden at render time may be necessary. **Rachel Davidowitz**

24 **$cLength colour modulation** You can control primitive colours based on length:
$mult = ccurve($cLength,0,[0,0,0],4,0.958537,[1,0.74902,0.215686],4,0.534884,[0.878431,0,0],4,0.244186,[0.439216,0,0],4);
$clump=$mult*$cLength;
Expand ($clump,0,1)
This expression uses a colour ramp and the $cLength parameter to control the primitive's colour. **Michael Todd**

25 **Animated archive frame offset expression** When using animated archive objects, you can use an expression to offset and randomise the animation at a given frame:
$startFrame=1.0000;
$endFrame=120.0000;
$cyc=13;#0,120
(cycle($frame,$startFrame,$endFrame))+(rand(($aIndex+$id),$cyc))
This expression cycles the archive object animation and adds a random offset based on the object's index and ID number. **Michael Todd**

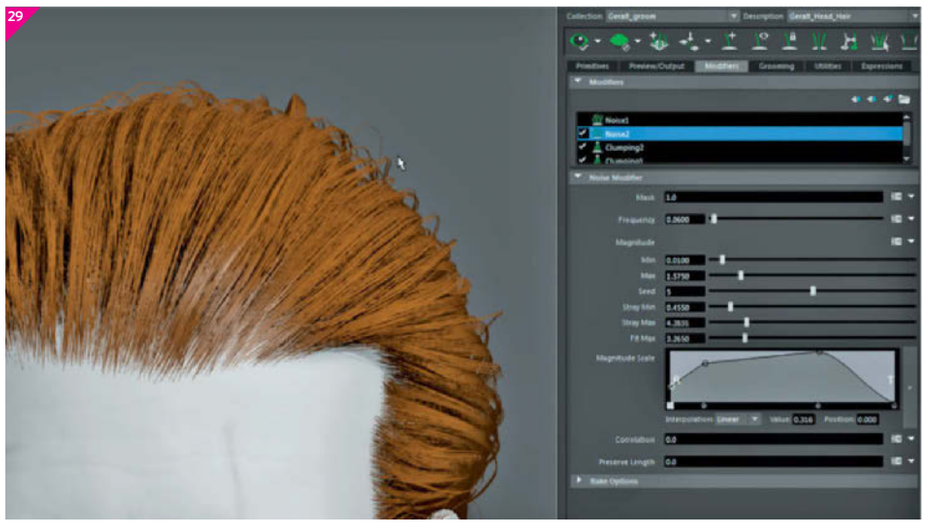
26 **Remove colliders, emitters and accelerators** When a previously assigned collider is removed, the Bifröst attributes will no longer be connected in the Node Editor, but they still exist on the Collider Shape Node and appear active in the Attribute Editor and Channel Box. Bifröst attributes can't be eliminated from meshes after creation. **Rachel Davidowitz**

27 **Bifröst high-quality mesh** Bifröst particles are assigned a liquid shader by default that can be rendered using mental ray. More control of the final look of the liquid can be achieved by enabling Bifröst Meshing in the bifrostShape node and adjusting the mesh settings. Increasing Droplet Reveal Factor, decreasing Surface Radius, decreasing Kernel Factor and Increasing Resolution Factor will all increase detail. **Rachel Davidowitz**

28 **$cLength noise modulation** XGen's in-built expression language, seexpr, can use the final calculated length of the primitives as an input in expressions. Using $cLength, you can have a noise modifier that has more (or less) of an effect on hairs, based on the length of the primitives:
$mult=0.6850;#0.00,1.00
$clump=$mult*$cLength;
expand($clump,0,1)
This expression multiplies the magnitude of the noise by the hair's length so that shorter hairs are less affected. **Michael Todd**

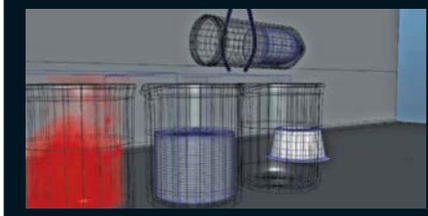
29 **Stray hair usage** You can utilise expressions to affect a given percentage of hairs in one way and then affect the rest of the hairs in another way. For instance, you can create a global (float) expression by making use of the Expressions tab to set a percentage value of hairs that are designated stray:
$percentStray=5;#0,100
rand() < $percentStray/100.0 ? 1 : 0
Then use an expression to affect those stray hairs more in the magnitude of a noise modifier:
$min=0.0100;#0.00,0.20
$max=1.5750;#0.20,10.00
$seed=5;#0,10
$strayMin=0.4550;#0.0,5.0
$strayMax=2.4000;#1.00,20.00
$strayNoise=rand($strayMin,$strayMax,8);
$mag=rand($min,$max,$seed);
$noise=strays() ? $strayNoise : $mag;
$fitMax=5.6850;#0.00,20.00
fit($noise, 0,1,0,$fitMax)
Michael Todd

30 **Groomable Spline Mirroring with masks** You can use the Mask brush in the groomable spline to mirror chosen areas of the groom. Paint a mask on the splines you want to reflect across the x axis and then flip to the appropriate side. Only the masked area will be flipped. **Michael Todd**



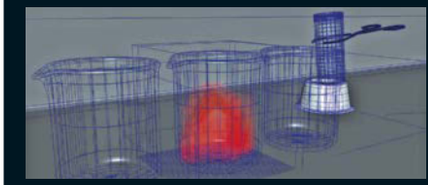
COMPOSITE LIQUIDS WITH BIFRÖST

Using a combination of Bifröst, Maya fluid and compositing, Rachel Davidowitz shows us how to visualise mixing a coloured liquid into water. For a more detailed tutorial you can visit clarafi.com



01 **Liquids** First off, animate a test tube which pours liquid into a beaker that is already containing liquid.

02 **Bifröst pouring** Add Bifröst emitters and colliders to create the liquid pouring effect.



03 **Work with Maya fluids** Use a Maya fluid to mimic the mixing of the two liquids.

04 **Colour render** Now render two versions of the pour scene with two colours of liquid.

05 **Post-production** Composite two versions in post-production to create the final scene.

© Clarifi.com 2016

LIGHTING & RENDERING

31 **Optimise your lights** It's a good idea to have an understanding of which lights optimise your scene best. For example, Point Lights are cheaper (faster render time) while Area Lights are more expensive (slower render time). Area Lights create the softest look because they send out more light rays over a large area. It's a higher quality light but you have to make sure you balance quality versus your deadlines. **Molly Meyer**

32 **Utilise IPR (interactive photorealistic rendering)** Using IPR in the Render View allows you to render your images more rapidly than a normal render would – this is because as you make changes to your scene the Render View will automatically update. There's no need to click the render button again and you can just leave the window open on the side while you continue to work. You can also pause and refresh IPR for when you need to briefly switch your focus onto something else. **Molly Meyer**

33 **Use gobos to shape lights** Gobos are textures that can be attached to lights so that your light casts a certain shape. For example, gobos can be used to fake dappled light and caustic water ripples. This way you don't need to manipulate geometry to get the shadows you want for dappled light, and your light doesn't have to physically refract through water to achieve caustic ripples (both of which would increase render times). **Molly Meyer**

34 **Photorealistic reflections with HDRIs** Using an HDR image in Maya's Image Based Lighting system is great for achieving photorealistic reflections and bounce lighting. Once you are happy with your HDR and have it set it up you can start adding extra lights. **Amaru Zeas**

35 **Arnold light blockers** Sometimes you want to fake a shadow or just block light from reaching certain areas. With Arnold, you can add an aiLightBlocker filter to your light to create a cube that you can manipulate. The cube blocks light from touching any geometry intersecting through it and isn't actually geometry itself, so it doesn't slow down your scene. **Molly Meyer**

36 **Adjust your bucket size** Larger buckets take up more RAM and smaller buckets take up less. Smaller bucket sizes are great for previewing sections of an image because the renderer is able to churn out more buckets quicker, but at the same time the renderer may be performing the same calculations over and over again (in which case a larger bucket would be more efficient). The optimal bucket size varies depending on the complexity of your scene so it's a good idea to experiment with it. **Molly Meyer**

37 **Work with Ai Skydome Light** Skydome lights are great for lighting outdoor scenes, or simple scenes with a single object, as they can do the job of multiple lights in one. HDR images can be attached to the light's Color channel and the skydome light will send light rays mimicking the colour of the image. It is also good for providing images in specular reflections. **Molly Meyer**

38 **Use Light Shape** I highly recommend to use Area Lights and don't forget to turn on Use Light Shape. For directional shadows you can make use of a directional light. **Amaru Zeas**

39 **Emitting photons** You can emit photons from any light source (even from your HDR image) – this will help you blend the overall colours of your scene a little more. **Amaru Zeas**

31

MUST-HAVE MAYA PLUGINS

EBLAB TOOLS
eblabs.com
This world space tool is very capable of creating constraints easily, and being able to modify a rig on the fly. Once you have done your edits, you can remove the constraints and it will be able to apply the new posing to your existing rig. There are many useful resources, like tutorials, on the ebLabs website.

STUDIO LIBRARY
studiolibrary.com
Studio Library is a free tool for Maya that organises saved poses and animations. It uses a real-time pose blending system and is super useful for sharing animations amongst different characters with the same rig setup. It's a must-have for sure.

PULLDOWNIT
pulldownit.com
This powerful dynamics plugin is designed for creating fractures, shattering effects and large-scale destruction as well as to handle massive rigid-body simulations of thousands of objects, all in a very timely fashion.

CARBON SCATTER
carbonscatter.com
For detailed environment work, Carbon Scatter enables you to populate scenes with millions of plants or other objects through its instancing system. It also then enables you to control behaviour by utilising the ecosystem tools for very natural results.

UNWRELLA
unwrella.com
This automated unwrapping plugin handles large numbers of objects. It's a single-click solutions for unfolding low- and high-poly objects to make UV Maps with optimal UV space usage. The UV Maps generated are suitable for texture baking too.

40 **Use existing TX textures and file loading with Arnold** Converting your textures to TX and then checking the box 'Use Existing TX Textures' in the Render Settings can help you to speed up your render times. Rendering is faster because Arnold's texture system doesn't load the parts of the TX texture that can't be seen in the rendered image. Also, if the renderer has to load two different files that contain the same data, Arnold will only load it once and keep it in its even smaller texture cache. **Molly Meyer**

NVIDIA® QUADRO® ACCELERATE YOUR CREATIVITY.

Accelerate your creativity with NVIDIA® Quadro® — the world's most powerful workstation graphics.

Whether you're developing revolutionary products or telling spectacularly vivid visual stories, Quadro gives you the performance to do it brilliantly.

NVIDIA Quadro M6000 VCQM6000-PB	
NVIDIA Quadro M5000 VCQM5000-PB	
NVIDIA Quadro K5000 MAC VCQK5000MAC-PB	
NVIDIA Quadro M4000 VCQM4000-PB	

NVIDIA Quadro K2200 VCQK2200-PB	
NVIDIA Quadro K1200DVI VCQK1200DVI-PB	
NVIDIA Quadro K620 VCQK620-PB	
NVIDIA Quadro K420 VCQK420-PB	

Learn more **www.pny.eu/quadro & pny.quadrok-selector.com**

Insight
uk.insight.com
Tel: 0844 846 3333

Misco
www.misco.co.uk
Tel: 0800 038 8880

Dabs.com
www.dabs.com
Tel: 0870 429 3825

Scan Computers
www.scan.co.uk
Tel: 0871 472 4747

PNY® Professional Solutions

NVIDIA Quadro® / Tesla® / GRID™ / PNY SSD

NVIDIA

© 2014 NVIDIA Corporation. All rights reserved. NVIDIA, the NVIDIA logo, and Quadro are trademarks and/or registered trademarks of NVIDIA Corporation. All company and product names are trademarks or registered trademarks of the respective owners with which they are associated.

Animate an AWARD WINNING SHORT

Discover the recipes for transforming an animation into a prized film, with these top tips and expert advice from outstanding artists

The world is so awash with short films – both live action and animated – that making one must be easy, right? Wrong. But it is doable, and it's certainly a great way to hone your craft and to send your CV out into the world in an entertaining, visually impactful way. The first hurdle is story.

"I think a lot of people have trouble with story," says Ellen Su (**ellensu.tv**), co-director of 'Spacebound' (**spaceboundthemovie.tumblr.com**). "People tend to develop these crazy, complex universes in their heads and get stuck trying to fit all these little details into what is supposed to be a short film." Su's advice is simple: if it isn't crucial to the plot, cut it.

Fortunately, she also believes you don't necessarily need a writer to tell a solid story. "Good stories are usually familiar ones," she says. "[They're] stories that we can all relate to and understand the motives of. Taking the essence of a classic story and re-creating your own version of it is usually a good approach. I've seen many successful animated shorts that were just an abbreviated or personalised version of an archetypal story."

Depending on your ambitions for your project, funding can be the other issue that wannabe film-makers have to tackle for the first time. For Aude Danset (**mishimasaiko.com**) the biggest challenge she faced in making 'Premier Automne' was "to gather all the tools to make it happen, and most of all the funding. This implies a lot of administrative tasks that kind of disconnects you from the creative part of the film."

But whatever the challenges, the advice of Su is to "just get cracking. Your first film will never be perfect, and that shouldn't be the goal, but you can get better at it if you keep making films..."

Home Sweet Home

How to make characters out of inanimate objects

Award: **BEST ANIMATED SHORT, SIGGRAPH 2014**

Alejandro Diaz (**lejodiaz.com**) now works at Oriental DreamWorks, but in 2012 he was working with three other students at Supinfocom Arles on their graduation film, 'Home Sweet Home'.

Alongside Pierre Clenet, Romain Mazevet and Stephane Paccolat, Diaz tackled a big challenge as the characters were actually houses. He explains that: "The fact that they were houses was, at the same time, the coolest thing about our short film and also the one aspect that didn't let us approach almost any step of the pipeline in a conventional way. Starting from story, where we had to come up with reasons for a house to uproot itself and start a journey, [we asked] ourselves questions like: 'What could happen to a house during a road trip? How can we create a friendship between houses? Can houses even have friends?'"

It was even more of an issue when it came to character design, as they tried to find a balance "between a believable house, from a real world, and a house that could be appealing, have expressions, communicate with the audience and still be engaging. What would that mean in terms of shape language and design?"

"We had to model the main characters differently from the regular prop house of a set because they had to be animated," Diaz explains. "Then there was the pipeline management of hundreds of roof tiles, wood tiles for the walls and other sub objects. With rigging we had to figure out a way to create a low-definition version of our houses so we could be able to actually move them in Maya."

Animating a house isn't the same as animating a humanoid character either. They were constantly thinking about "the weight they have to show without making the pace too slow. We had to find clever ways to communicate their emotions and develop their different walk cycles to give each one of them a different personality."

Maya, 3ds Max, FumeFX, MARI, Photoshop, NUKE, After Effects, V-Ray and Premiere Pro were all used in production, which took the best part of a year. All the effort was certainly worthwhile though, as 'Home Sweet Home' won Best Animated Short at SIGGRAPH in 2014. Learning to work in a team was a big take-away for Diaz, as was the importance of knowing what you want to create. "In my opinion, a good story, a bold statement, a clear author's intent or a strong structure will always be better than the good execution of a poor idea," he says.

Premier Automne

For the artistically ambitious short 'Premier Automne', Aude Danset says the core team was six people. However, there were "around 20 people involved at different stages, with diverse implication degrees – that covers the production, the script doctoring, 3D designs and the post-production. If we include the soundtrack and the sound effects, that includes even more people."

"As for the pipeline," said Danset, "we shared the work between two areas as we obtained some funding in two different regions (Nord-Pas-de-Calais and Languedoc-Roussillon). Therefore we entrusted the 3D animation to our team in southern France."

A professional approach had to be taken, as the team were also developing their own 3D tools to create their designs, "for the characters' hair (using Softimage ICE and XSI), as well as for the footsteps in the snow or the growing nature."

Danset's advice is simple: "I would recommend to work with the most simple pipeline and light technique [so that you] leave room for creativity, and keep the story and the image at the core of the project."

Globosome

How to do particles on a less-than-Hollywood budget

Award: **BEST STUDENT PROJECT RUNNER-UP, SIGGRAPH 2012**

Nobody could say Sascha Geddert's short film, 'Globosome', lacks ambition. Tracking the birth and death of a planet and its entire ecosystem in just a few minutes was inevitably challenging, but it helped that Geddert started with bags of passion.

"There were three core inspirations," he explains, "climate change, how cells communicate and how, with our new tools, we can watch ourselves on this planet like we can watch bacteria under a microscope. What makes humans actually different from bacteria in a petri dish if you look at the world with this long-lens approach? We have yet to move from an age of consumption to something more sustainable. It's a huge paradigm shift and frankly I got worried when I realised how little people seemed to care."

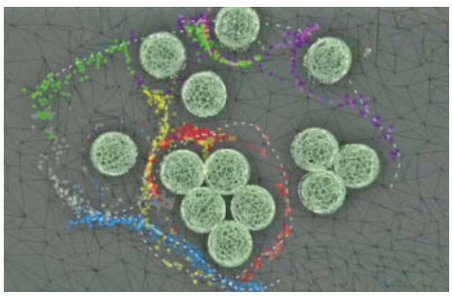
From there he imagined "how maybe other planets in the universe have to move through this transition to renewables as well and sometimes fail to do so. The story of a planet going through several stages was born." With such a dramatic idea, the biggest challenge was the story. As Geddertt says, he had to "fit the evolution of a whole planet in a few minutes without words," which was hard.

And even with the beats storyboarded, there was the challenge of creating all the elements required. "Handling the amount of details," was tough, says Geddert, as well as "the design and stereoscopic 3D. Fortunately I had help with the 3D stereo by Andreas Feix, a fellow student who is himself nominated for a Student VES Award."

Fortunately, Geddert wasn't working alone. "There were about eight people in the core team: a producer, sound designer, musician, compositor and then several technical directors – they would build systems I could use to do animation that was impossible to do by one person by hand."

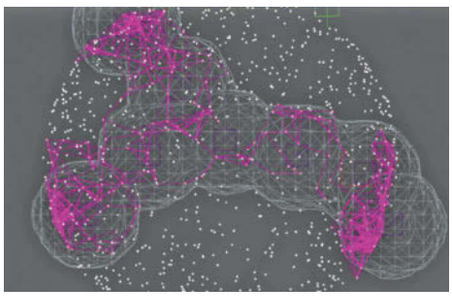
The primary tool of choice was 3ds Max, with V-Ray for rendering, GrowFX for the plants, MultiScatter for the distribution of details and Thinking Particles for most of the crowd dynamics. "These plugins," Geddert says, "together with some custom-made tools, made by TDs, made it possible for me to do a lot of the 3D work myself."

And Geddert's passion shows no sign of letting up. The film was runner-up for the Best Student Project at SIGGRAPH 2012, and he's been continuing to work on 'Globosome' since: "I just completed a project in San Francisco for a new game engine with 'Globosome' as a basis. We hope to release it as a SIGGRAPH paper later this year."



01 Animate multiple objects "One 'Globosome' is easy," says Geddert, but "many are pretty hard. We developed a system in Thinking Particles that would allow me to animate helper objects and have the balls scattered and animated automatically."

03 Plant assets The design of the plants was the other key issue, as they had to be distinct from the 'Globosomes' in the scene. First Geddert "tried something dandelion-like but it produced too much noise in the canopy when grouped together."



02 Globosome animation "The 'Globosomes' would avoid obstacles, collide with each other and cycle though different animation cycles based on the slope of the terrain. We also built a 'plexus-like' connection system in Thinking Particles."

04 Plant designs After all of this, Geddert decided to go with "a lush design including (back scattering) leaves and lots of spirals. I grouped little chunks of trees/grass so they didn't [get too chaotic] and are pleasing to the eye."

Let's Talk About Soil

How to animate a winning documentary

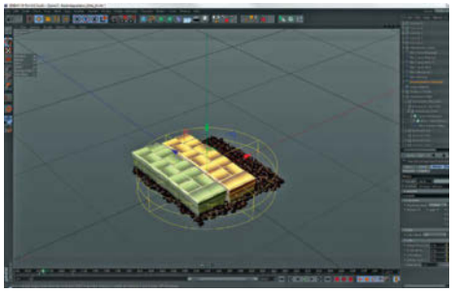
Award: **BEST VISUALISATION, ANIMAGO AWARD 2013**

If you're a 3D artist, primarily wanting to make a short film in order to demonstrate your 3D talents, then why not consider making a documentary? Not only is it a perfectly valid way to show your style and skills, but it's more unusual and therefore more likely to stand out. You might even get someone to commission it.

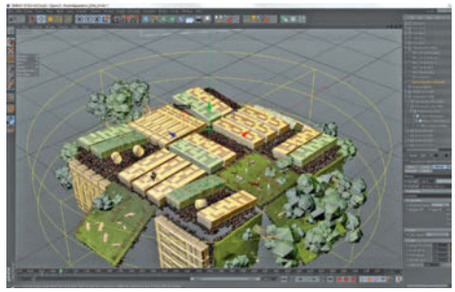
'Let's Talk About Soil', which won the Animago Award in 2013 for Best Visualisation, was directed by Uli Henrik Streckenbach of Uhsless (**uhsless.de**), an animation and design studio in Berlin. It was commissioned by the Institute for Advanced Sustainability Studies to create awareness of the importance of our soil. For Streckenbach, the "biggest challenge was the storytelling, especially giving the protagonist of the film – the soil – a face (obviously without giving him an actual face). I had no script given by the client and first of all had to work as an author." He did a lot of research, which gave him both scientific understanding and "also led to visual ideas that I am sure never would never have come to my mind without this research."

The film – which would eventually take 26 weeks of work – was initially only worked on by Streckenbach, but later Ronny Schmidt (**rosch.xyz**) joined to further "develop the style and worked on all the modelling and animation". They worked side by side so the pipeline was fairly straightforward. Streckenbach made an animatic based on the storyboard and then he "split the scenes between ourselves and completed them scene by scene. We got additional support by Maik Lochmann, who took care of the character modelling and rigging, and Marcus Illgenstein, who composed the music and did the sound design." Cinema 4D was used for all of the 3D work, and then After Effects was used for the compositing. He had used 3ds Max before 'Let's Talk About Soil', but the process of working on the short has converted him.

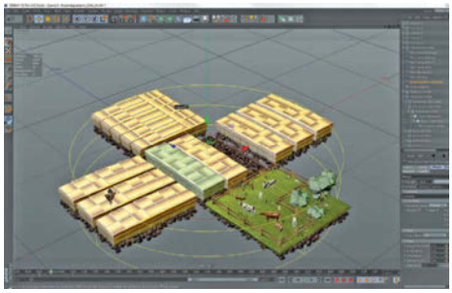
When applying for festivals, Streckenbach advises you to use "platforms like Shortfilmdepot, Withoutabox or reelport, which makes it way more easy to apply for different festivals. You just set up your work with all necessary info one time and then can apply to as many festivals as you want." He is now working on another "explainer movie" about land rights for the same client, but his process has since evolved. He now has "more people working with me directly from the beginning, which makes the script development and storyboarding so much more fun, and better."



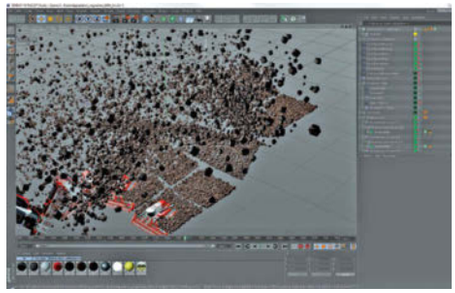
01 Work with earth in MoGraph Flipping the different areas of earth was a key component that Streckenback wanted to achieve. "This was done in Cinema 4Ds' MoGraph and triggered via an Effector," he explains.



03 Reveal the plates "To achieve the time offset of the revealing of the plates, we animated the size of the falloff." MoGraph – rather than 'fancy' particle simulation – was also used to show soil erosion.



02 Plate positioning "A MoGraph cloner object was used to create and position the different plates. With a simple plain effector – that affected the rotation and the visibility of the clones – the plates were revealed."



04 Wind effect "Here are a couple of different effectors to manipulate soil elements, created by using a cloner object. A Shader Effector with an animated noise map simulates the effect of wind blowing over the field."

Serial Taxi

How to do everything all by yourself

Achievements:
- **FESTIVAL CREATED TO CELEBRATE SERIAL TAXI 2015**
- **AIRED ON PBS IN 2014**
- **FINALIST – BANG AWARDS 2014**

When Paolo Cogliati (**paoloanimates.com**) needed to make a graduation film at the Ringling College of Art and Design, he decided to make the project a solo one. This was a challenge not only in terms of workload, but also experience. Cogliati explains that he had been "primarily focused in animation and storytelling rather than the other aspects of production, but I decided to make the film entirely alone with zero budget in one year's time."

The idea that would become 'Serial Taxi' (**serialtaxi.com**) came from an experience Cogliati had in Russia, where he "genuinely believed one of my taxi drivers was going to kill me". The key thing that he learnt was that he had to work as if it were a big-budget feature, even though it wasn't. That meant producing animatics during production, particularly because he wanted to get the ending right, as well as seeking critique at every stage. He says: "I also constantly sought feedback both from strangers and people that were familiar with my film. This allowed me to see both perspectives and edit what was echoed by both parties."

Cogliati used Maya, RenderMan, Photoshop, After Effects, Premiere Pro, headus UVLayout and Flash, so organising his process, films and time "as if I were a studio" was the only way that the film got made. "It will really make a difference once you are halfway through it," he says. "The amount of files you accumulate when creating even a two-minute film is unbelievable, and it will help you navigate through the film with ease."

Juggling all the different stages of production alone is a tough task, so Cogliati spent half an hour "at the beginning of every day to outline what I needed to accomplish that day, in what order, and how." Cogliati then ensured that he animated all of the most difficult shots first while he was still feeling creative and not overwhelmed, and then he "made sure to organise my files so that shots that needed more animation work on them were categorised based on priority, and while the computer was rendering I had a second monitor where I could polish without being idle."

Cogliati then also "separated the characters and the environment from each other to keep the scenes light, and then composited the characters in the background much like they did in old movies with a projector behind the actors."

Not only was 'Serial Taxi' a hit on the festival circuit, appearing all over the world, it actually had a festival created around it. Young film-makers in Venezuela re-created the film in live action, with Cogliati – whose work includes the writing of a feature screenplay called 'Little Blue Lies' as well as working for The Mill – judging their efforts.

Festivals to enter

THE ACADEMY AWARDS
Best Animated Short Film
oscars.org/oscars

STUDENT ACADEMY AWARDS
Gold/Silver/Bronze Animation
oscars.org/saa

SIGGRAPH
Best Animated Short, Best Student Project
siggraph.org

ANNIE AWARDS
Best Animated Short Subject, Best Student Film, Best Animated Special Production
annieawards.org

ANNECY FILM FESTIVAL
Cristal for a Short Film, Jury Award, Award for a First Film, Jury Distinction, Audience Award
annecy.org

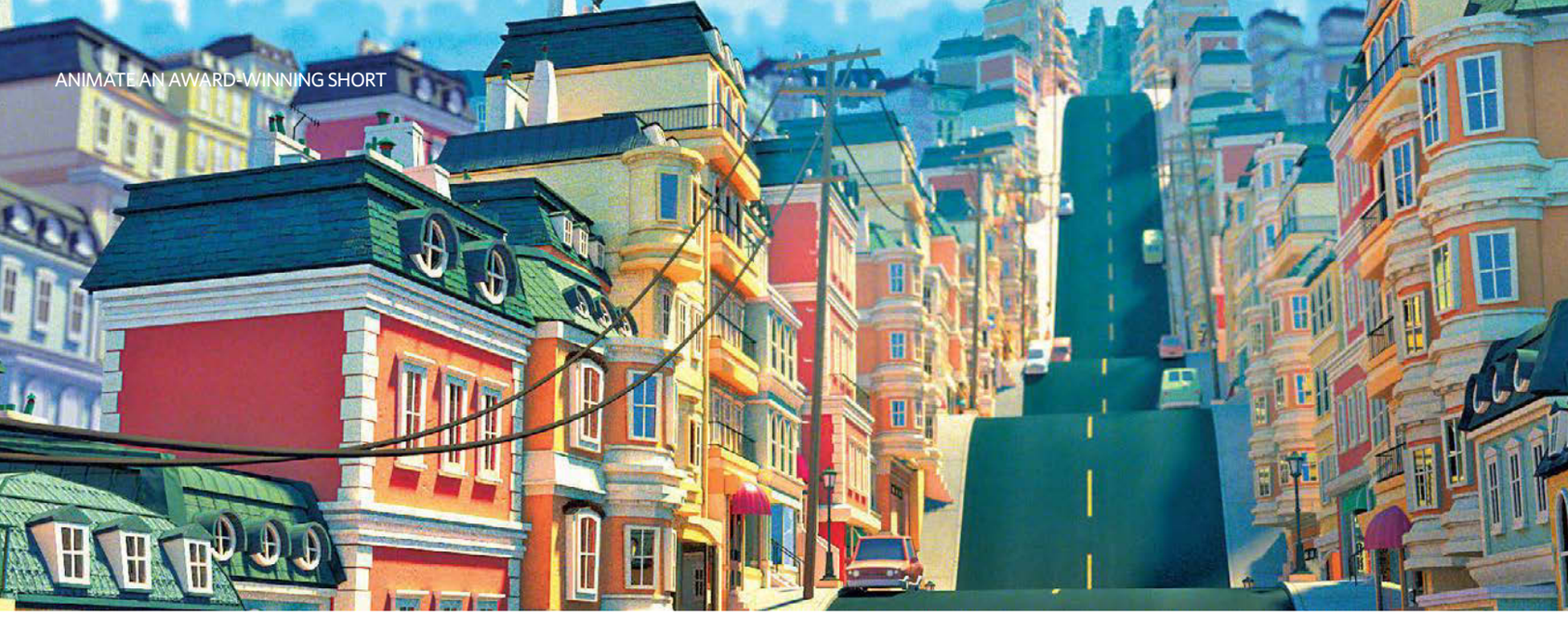
FESTIVAL DE CANNES
Cinéfoundation First, Second and Third prize; Short Film Palme d'Or
festival-cannes.fr

ANIMAGO
Best Short Film, Best Young Production
animago.com

ANIMA MUNDI
Audience Award, Professional Jury Award
animamundi.com.br

STUTTGART INTERNATIONAL FESTIVAL OF ANIMATED FILM
International Competition, Young Animation
itfs.de

DIGITAL ANIMATION FESTIVAL NAGOYA
Grand Prix, Audience Prize
digihakunagoya.com



Jinxy Jenkins, Lucky Lou

How to concentrate on craft

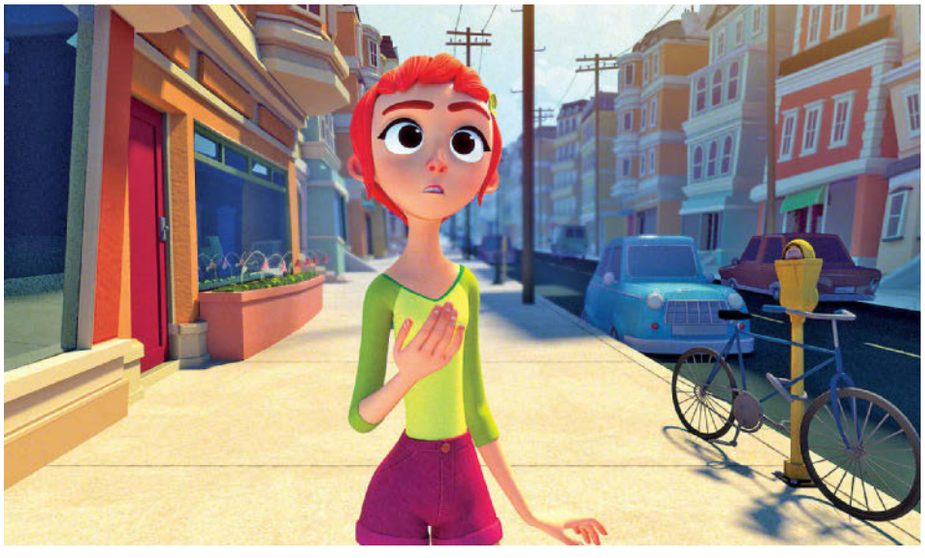
Awards:
- **SHORTS, HAMBURG ANIMATION AWARD 2014**
- **BEST COMPUTER ANIMATED SHORT, SIGGRAPH 2015**

Created with Maya, Photoshop, Premiere Pro and NUKE, the award-winning short 'Jinxy Jenkins, Lucky Lou' took co-directors Michelle Kwon and Michael Bidinger a year and a half to make. The care taken shows on screen, with Kwon saying "You should know your characters, and want to share their story with the world. If you're passionate about your project and you have the necessary tools, everything will fall into place."

While the initial story was there from the off, the specific story points were trickier. The pair had to "show as much as we could without making it too long. We were able to show who the characters were and why they were unhappy pretty efficiently after we went with the split-screen idea. It added style too... The specific obstacles [the characters] face are what changed the most," explains Kwon. "Each peril had to be things luck related or something that Jinxy and Lucky could influence with their luck – at one point we had her throw a lucky penny to change the path of a train on some railroad tracks or something, but that was too complicated and at some point we both said 'Screw it, let's just have a bunch of falling pianos!'"

Kwon and Bidinger both modelled, animated and directed the film in equal parts, but they also had specific areas of focus. Kwon says: "I was more of the art director of the film, overseeing the design of the characters and environments and making sure it translates well to 3D. Mike took on the role of lead animator/technical director, making sure the acting told the story well in addition to taking care of all technical necessities of the film." There was also a third member of the team, Sarah Kambara, who managed production and festival submissions. "We are so grateful for her because it allowed us to solely focus on making the film," Kwon adds.

The scale of the film and making the city feel populated were two of the biggest obstacles,. "To do so," says Kwon, "we scattered some moving cars here and there. The city still ended up feeling a little empty, but Jinxy and Lucky are moving so fast for most of that it wasn't too much of a problem. We were able to make the city feel varied and city-like by using a modular approach to modelling; building a few variations of separate parts to put them together in different combinations – like LEGO."



KeyShot®
Amazing renderings and animations. In realtime.
The flexibility to work with your ZBrush/Maya/3DS/ files. Luscious materials that are ready at the starting gate. More time to create beautiful images. Less time wasted. You can create high-quality visuals faster than ever before, and you can do it using KeyShot.
Model by Luigi Memola
behance.net/memolaluigi
Learn more at
keyshot.com

BUILD YOUR OWN 3D WORKSTATION FOR £2,000

Save some money, choose your own components and design the perfect workstation for you by building it yourself

Building your own PC is easy, even if you've never done it before. It can save you money over buying a pre-built PC and you have absolute control over exactly what goes into it.

To briefly summarise, you'll need to buy a CPU, a cooler for it, a motherboard and memory, a video card, storage, a power supply and a case to house them. Assemble them all together by making use of a good screwdriver, install an operating system (such as Windows or Linux) and then you're just about done.

It's harder to know which components are right for a PC that you want to be suitable for 3D design. You're only a quick Google away from useful advice about building a PC for gaming, but 3D software works differently. The right CPU or video card for gaming isn't always the right choice for 3ds Max or ZBrush. You'll need more memory, you might want more CPU cores, and the video card is used for background rendering tasks and 3D acceleration. There are a few technical limitations on the possible motherboard and processor combinations you can choose, and when building a PC, there are some small details worth paying attention to. If you opt for water cooling, then you will need a case that can also accommodate a radiator, for example.

Thankfully, **3D Artist** knows a lot about workstation hardware, which is why we're imparting some of this knowledge on to you, to help you build your own workstation or maybe just to make a more informed choice about your next purchase – all for just £2,000.

The right CPU for the job

Choose a processor based on its core count and clock frequency

Modern CPUs differ in two respects: in how many cores they have, which affects performance in multithreaded software, and in their clock frequency, which roughly correlates with single-threaded performance. Most 2D and 3D design applications are multithreaded, and therefore long processing tasks and rendering jobs will perform quicker with more CPU cores.

Expensive Xeon processors are the choice for high-end workstations. They comes with dozens of cores and can be used in dual-processor motherboards, making short work of insanely detailed renders that would take hours or even days to complete with a single quad-core chip.

But they're overkill for less demanding rendering jobs. The best all-round option is one of Intel's more affordable Haswell-E processors, with six or eight cores, which can be overclocked to much higher clock frequencies with the help of a highly efficient cooler.

The six-core Intel Core i7-5820K processor, for example, costs just £280, and it can be overclocked well beyond 4GHz. If you want to spend a bit more the Core i7-5960X costs about £700, but has eight cores – enough to compete with and easily outperform mid-range Xeon chips.

You won't save much money by opting for a quad-core system unfortunately. That's because

the Core i7-6700K costs about the same as the i7-5820K; it offers slightly better single-thread performance, but detailed rendering jobs will have two fewer cores and it will also take much longer for the tasks to be completed.

Choosing a motherboard

For six or eight-core CPUs, you will need X99

A motherboard is the central nervous system of a computer, connecting the peripherals and storage to the CPU and memory. Its design is based on a chipset specification, which launches with a new processor generation from Intel.

The pin layout on the CPU socket limits the type of processor and motherboard combinations you can use. If you opt for a fast quad-core processor such as the Core i7-6700K, you'll need a Z170 motherboard with an LGA 1156 socket. If you want more CPU cores with a Haswell-E CPU such as the Core i7-5820K, you'll need an X99 motherboard with an LGA 2011 v3 socket, like the Asus X99-Deluxe, for example.

X99 has eight DDR4 memory slots, while Z170 only has four. For 3D design, where a single complex scene can require gigabytes of system memory, you might be grateful of the ability to fit more at a later date. That's a good reason to choose an X99 motherboard and a Haswell-E processor over Z170 and the sixth-generation Skylakes for a 3D build.

THE WORKSTATION RECIPE

Turn those boxes of components into a box of rendering power

01 **Unpack** Remove the motherboard, memory, cooler and CPU from the packaging. Place the motherboard either on the box it came in or on a (dry) static-free surface. Leave the other components for now.

02 **Fit the chip** Carefully secure the chip in the CPU socket and clip the DDR4 memory modules into the slots. On an X99 motherboard, they need to be in a quad-channel on alternating slots.

03 **Secure cooler** Fit the backing plate from your cooler to the underside of the motherboard. Then fit the mounting supports into the holes near the CPU socket and secure the cooler into the supports.

04 **More unpacking** Remove the sides and the internal packaging. Now fit the internal standoffs into the holes in the main tray tightly. Fit the motherboard's I/O backing plate into the space at the case's rear.

05 **Fit the motherboard** Place the motherboard into the case and line the holes with the standoffs. Secure with the screws from the case, but don't tighten them. Push the board into its I/O plate. For an AIO water cooler, fit the radiator to the case's roof.

06 **Connect cables** Fit the power supply into the case and connect the cabling. You'll need SATA cables for storage, a long ATX power connector, an eight-pin CPU connector for the motherboard, and a six or eight-pin connector for your graphics card.

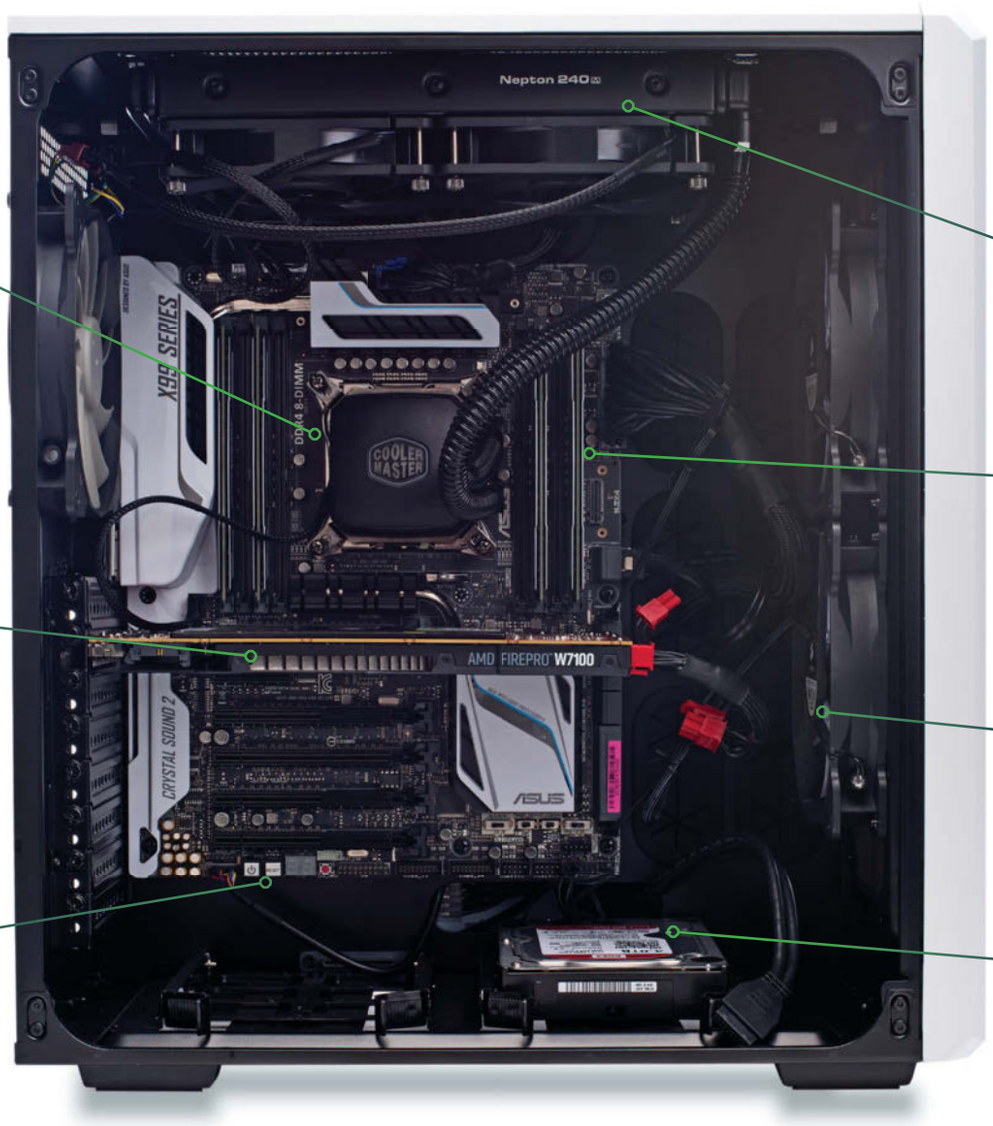
07 **Tidy up** Put the SSD, hard disk and graphics card into the case. You need a pair of SATA data connectors for the storage. Connect the power cables too. Try and feed the cabling through the holes inside the case, keeping them out of the way.

08 **Plug in** Put the sides on and plug in a keyboard, mouse and so on. Check the connections and the motherboard position are right. If something shows on the screen, go to the BIOS and ensure the internal CPU temperatures are at most 35 degrees when idle.

09 **Install Windows** Ensure the boot order is set correctly in the BIOS. Find your Windows installation disk (we use a USB stick, but if you're using a DVD you'll need an external drive). Boot off of the disk and follow the instructions to install Windows.

Inside the £2,000 workstation

The core components that complete our essential build



INTEL CORE I7-5820K
With six cores and 12 threads, the i7-5820k is very powerful. It can be overclocked to 4.5GHz.

AMD FIREPRO W7100
Eight gigabytes of GDDR5 memory ensures effortless performance when working in your favourite software.

ASUS X99-DELUXE/ USB 3.1
The X99 has an M.2 socket for next-gen SSDs that uses the PCI-Express bus, which is great for storage.

COOLER MASTER NEPTON 240M
FEP tubing has lower evaporation rates to keep your CPU cooler for longer.

CRUCIAL BALLISTIX SPORT (4 X 8GB)
Empty slots means we can add more memory later.

CORSAIR CARBIDE AIR 540
The Air 540 has a second chamber for tidy PSU and cabling housing.

WD CAVIAR RED 4TB
Designed for 24/7 operating, the WD Red is great for long rendering times.

Pick a power supply

A reliable power supply ensures stability under load

Reliability, low-noise output and plenty of connectors are the three main attributes of a good power supply. A 700W unit should provide enough for any CPU and graphics card combination, and it's worth spending a bit extra on a well-known brand to make sure it won't suddenly fall over when under load.

Go for a modular power supply if you can afford it, then the only cables in your PC are the ones you need, saving space and making it easier to keep the internals tidy.

Choose a workstation chassis

Good looks, airflow and spacing makes for a tidy machine

Internal airflow matters with any PC build as it is crucial at keeping your CPU and GPU at low temperatures, meaning slower fans and less noise.

A neat layout is more than just good looks too. If you want to upgrade components, it's preferable to have a case that gives you plenty of space to install new parts. We chose the Corsair Carbide Air 540 for its secondary rear section for housing cabling, hiding all of the cables from view and keeping your build looking neat.

AIR OR WATER COOLING?

Better overclocking potential with a water cooler, less hassle with an air cooler

Liquid cooling is usually more efficient than a heat sink and large fan. All-in-one units like the Cooler Master Nepton 240M make installation simple – you just need to mount the radiator somewhere in the case (either at the top or bottom). You may need to attach a custom backing plate or mounting bracket to the motherboard, and that can be fiddly.

Out of the box, coolers come with thermal paste applied to their base, which greatly improves efficiency.

OVERCLOCK THE CPU FOR EXTRA PERFORMANCE

With a good cooler, overclocking your CPU is really simple and improves overall performance

Press the Del key to enter the motherboard's BIOS when you first turn on the computer. On the Asus X99-Deluxe we have used, you need to go into an Advanced Menu to access all the overclocking settings. Asus calls its overclocking menu Ai Tweaker, where you only need to change a few settings to increase the CPU clock frequency.

You do so by adjusting the CPU multiplier and the core voltage slightly. Adding voltage increases the CPU temperature, which is why we have suggested investing in a high-quality water-cooling setup. Modern motherboards will automatically set the voltage for you, so you may not even need to worry about this.

There's no need to go crazy, with liquid cooling you can aim to increase the speed of a Core i7-5820K to a safe target of 4GHz, by using a multiplier of 40. Change Ai Overclock Tuner to manual, the CPU Core Ratio setting to 'Sync All Cores' and the 1-Core Ratio Limit to 40. Save the settings and then reboot.

If Windows does not load, or crashes during use, then you can manually set the voltage and raise it very slightly, in 0.05V increments. There is a considerable amount of trial and error ensuring the system is stable. The other option is to lower the multiplier. Try 3.9GHz or 3.8GHz if 4GHz is unattainable.

Fill your workstation with memory

You can never have enough RAM in a workstation

DDR4 memory is the new standard for modern PCs, with faster clock speeds than the DDR3 it replaces. It's usually sold in packs. With Z170 motherboards, memory is installed in matching pairs while with X99 it's used in sets of four.

You can never have enough memory in a workstation: 16GB is now the bare minimum for 3D design software, and 32GB or more is now a realistic possibility with individual 8GB sticks now for sale. We'd opt for capacity over high speeds every time, especially if you're going to be creating extremely detailed models and scenes.

It's best to purchase matching sticks with the same clock speeds. Although the speed does affect performance, it's not worth spending a great deal more on the fastest memory. Something in the middle will work just fine, which is why we opted for 2,400MHz modules.

Storage for Windows, apps and projects

Choose an SSD for fast loading times, with a secondary hard disk for archiving

Modern computers have been transformed by solid-state storage, which provides better transfer speeds and lower latency than traditional hard disks. With an SSD, Windows and applications load really quickly and you'll find the computer is more responsive. The difference is very noticeable. In any PC build, an SSD is now the most important storage component.

We'd suggest going for capacity over anything else. SSD prices are falling rapidly, and a 512GB SSD will provide enough affordable fast storage for a Windows installation, all of your applications and big project files. A hard disk is now relegated to being a secondary consideration.

SSDs are evolving though, and a new generation of drives that use a new type of connector called M.2 can run even faster than the older, SATA-based models. The Samsung SSD 950 Pro, for example, is able to read files at an insane 2,200MB a second and also write at 1,500MB a second.

They cost a bit more than standard 2.5-inch SSDs though, and that extra speed isn't entirely necessary. You could instead choose a traditional 2.5-inch SSD, such as the Samsung SSD 850 Pro or the Crucial MX200.

With a hard disk, you can now buy single drives that offer up to 8TB of capacity, and the extra space doesn't add too much to the overall cost. We'd go with a massive drive like that, but 4TB is enough for a while, as with the Western Digital Caviar Red in our system build.

Which version of Windows do you need?

Windows 7 has been the de facto standard for years, but it's time to move on

Having long been the preferred OS for 3D workstations, Windows 7 is a tried-and-tested operating system, but Microsoft is keen to standardise Windows 10 as the basis for its software for the long-term future. It may be early days for the OS since it only launched in 2015, but its support for the latest 3D APIs (such as DirectX 12) means Windows 10 Professional is a better long-term bet. Microsoft has indicated that Windows 10 will remain the baseline for all of its software updates, which is why it represents the long-term future of Windows.

Linux is always an alternative free option for 3D design, and proves popular with some artists. While you can always find applications for the same rendering work you can do on Windows, you'll often need to put some extra effort into finding the right tools.

Choose a graphics card

A GPU is important for real-time rendering and computing of background tasks

The sole purpose of graphics cards in a gaming PC is to render real-time interactive 3D environments, with all their exciting pyrotechnics. In a workstation, a graphics card has the additional task of accelerating compute tasks, via OpenCL or CUDA, depending on the software.

Certain highly parallel software tasks can be broken up and distributed among the stream processors of a graphics card, with a significant performance boost over that of a CPU alone.

There's a huge price difference between professional-grade and gaming cards though, and the professional-level cards have lower clock speeds and they also consume less power. They're designed to be used at full capacity for hours at a time, when a gaming card may only be used in short stints.

You can usually get by with a gaming card in an entry-level workstation as it will run anything you want, but for long-term use a Quadro or FirePro will be a more reliable choice. For our workstation, we've opted for an AMD FirePro W7100, as it offers excellent performance at an affordable price point.

THE 3D ARTIST 'TEAPOT 2016' WORKSTATION

The exact specification of our workstation, which came in at approx £2,000

The following components were chosen from Overclockers UK:

CPU:
Intel Core i7-5820K

CPU Cooler:
Cooler Master Nepton 240M AIO Liquid CPU Cooler

Motherboard:
Asus X99-Deluxe/USB 3.1

Memory:
32GB Crucial Ballistix Sport (4 x 8GB)

SSD:
512GB Samsung SSD 850 Pro

Hard Disk:
Western Digital Caviar Red 4TB

Video Card:
AMD FirePro W7100

Case:
Corsair Carbide Air 540

PSU:
Super Flower Leadex Platinum 750W Fully Modular

The total cost including VAT comes to around £2,000. Much of that price is taken up by the video card, as we have chosen one that sits at the upper end of the pricing scale. You can knock about £200 off the price by opting for a graphics card such as AMD's FirePro W5100, Nvidia's Quadro K2200 or even a gaming card such as the Nvidia GeForce GTX 980.

It's a decision you'll need to make, and depends on the software you use. If you spend more time with GPU-bound tasks, it makes sense to spend extra money on a more powerful graphics card, and opt for a professional model over a gaming card.

You could choose a pre-built system instead, such as one of Overclockers UK's RENDA workstations, or build one yourself.

The big difference is warranty. Overclockers offers a five-year warranty with its systems, including on any overclocked settings, so if the PC becomes unstable it will try to fix it. The first three years of the five-year warranty are collect and return, with two years labour.

"The fastest and easiest way to texture"
- Simon Fox, Blizzard

"Holy shit this is bad ass"
- David Lesperance, Valve

"An essential part of my pipeline"
- Josh Marlow, Epic

Quixel SUITE 2

OUT NOW

www.quixel.se

Scan based PBR painting. Straight in Photoshop.

Technique focus

Incredible 3D artists take us behind their artwork

DETAILING Throughout the project we constantly referred back to a comprehensive source of reference photography of one particular model of tyre – the period Avon Turbosteel tyre with a Dunlop steel rim. We created much of the detail in 3D, from every groove in the tread to the detailed lettering, and applied the weathered, worn look in Photoshop.

INK

INK
weareink.co.uk

INK is an award-winning production studio that delivers crafted digital content

Software 3ds Max, V-Ray, Photoshop

The Jaguar D-Type, 2015

Lenovo® recommends Windows.

lenovo

MAXIMIZE USER PRODUCTIVITY

LENOVO THINKSTATIONS ARE BUILT FOR PERFORMANCE AND RELIABILITY.

TOOL-LESS DESIGN | SIMPLIFIED MODULAR ARCHITECTURE | HIGHLY SCALABLE | ISV CERTIFIED

Delivering breakthrough levels of pipeline efficiency with up to 96% more performance than previous generation workstations, **Lenovo ThinkStation P Series** are powered by Intel® Xeon® processor E5-2600v3 series **and** the latest NVIDIA Quadro® professional 3D graphics; enabling them to run faster than ever before. **Empowering visualisation professionals with serious amounts of processing power for their rendering workflow.**

UNCOMPLICATED USAGE
- Tool-less and cable-free design
- FLEX features and intuitive touch-points
- Easy configuration and customization

INTELLIGENT COOLING
- Patented tri-channel architecture
- Our coolest workstations with just 3 system fans reducing downtime and maintenance

UNMATCHED PERFORMANCE
- Up to 4x high-end NVIDIA graphics cards
- NVIDIA Quadro® and Tesla® GPU options
- Quad Channel DDR4 Memory
- Supports up to 14 high performance storage drives

FOR THOSE WHO DO.

NVIDIA®

sales@thinklogic.co.uk
0845 475 1155

thinklogic

www.thinkworkstations.com

Lenovo makes every effort to ensure accuracy of all information but is not liable or responsible for any editorial, photographic or typographic errors. All images are for illustrative purposes only. For full Lenovo product specifications visit www.lenovo.com Lenovo makes no representations or warranties regarding third-party products or services. Trademarks: The following are trademarks or registered trademarks of Lenovo: Lenovo, the Lenovo logo, For Those Who Do and ThinkStation. Microsoft and Windows are registered trademarks of Microsoft Corporation. Other company, product and service names may be trademarks or service marks of others. ©2015 Lenovo. All rights reserved.

The Pipeline

Expert advice from industry professionals, taking you from concept to completion
All tutorial files can be downloaded from: **filesilo.co.uk/3dartist**

> In addition to basic asset preparation, we'll cover camera matching to make sure our lensing and perspective match up

ALDO VICENTE
Mayflowers, 2015

Software

Maya, mental ray, NUKE, Quixel SUITE 2, Photoshop

Learn how to

- Match cameras
- Integrate backplates
- Map HDR tones
- Do multipass compositing

Concept

This is an astronaut exploring the forest wilderness just outside of her capsule, after landing on an uncharted Goldilocks planet.

YOUR FREE DOWNLOADS from **filesilo.co.uk/3dartist**

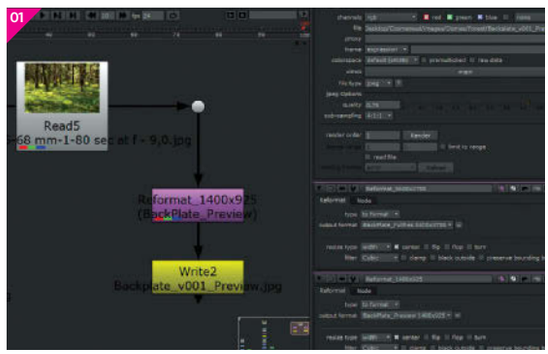
- Tutorial screenshots
- Video tutorial

Master backplate integration

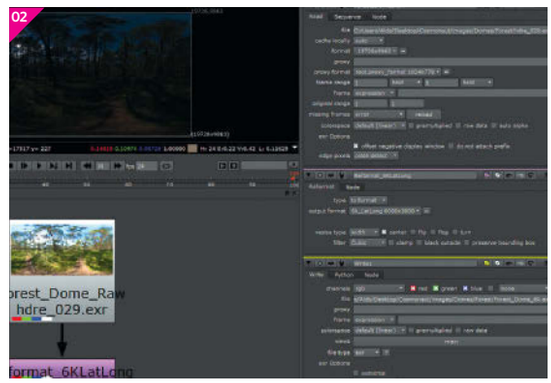
Use compositing and rendering techniques to light a character and learn how to use camera matching for an astronaut and planet discovery scene

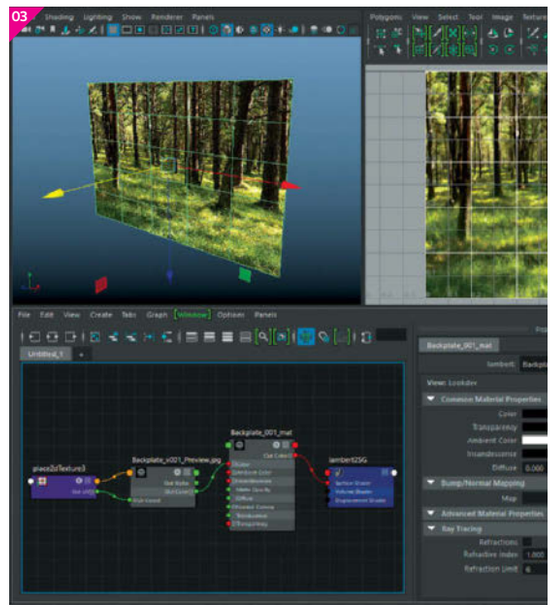
There are a lot of useful techniques for lighting and shading our 3D assets on a photographed backplate that we'll be going over in this tutorial. In our scene, we are integrating a CG astronaut character exploring an uncharted forest environment. This scenario is set up specifically to help us practise the key concepts of backplate integration. In addition to basic asset preparation, we'll cover camera matching to make sure our lensing and perspective match up; physically based, energy conserving shaders, to ensure our materials react naturally to our environment; HDR tone mapping to have our light intensity, light colour, and environment reflections match our background; and compositing techniques to bring everything together and put the finishing touches on our integration. We'll be using Maya and mental ray 2016 with a particular set of photo assets, but the instructional emphasis in this tutorial is on the overall concepts, so anyone can follow along with their own tools and assets. It can be a bit of a challenge at first, but it's also a very fun and very useful skillset for any 3D artist to learn. So let's get started!

01 Prepare the backplate The backplate is the image we'll be integrating our assets into. We'll be using photo assets from **HDRMaps.com**, which is a really great resource for well-prepared HDR domes and backplates. Let's take our raw backplate into NUKE and plug in a reformat node to resize it to 5600 x 3700 – we can write it out in an 8-bit, lossless format. This will be our final image backplate, however we don't need to slow down our scene with this massive full-resolution image, so let's use another reformat node to write out a working resolution image at 1400 x 925. This resolution is the copy we'll be using inside of our scene.



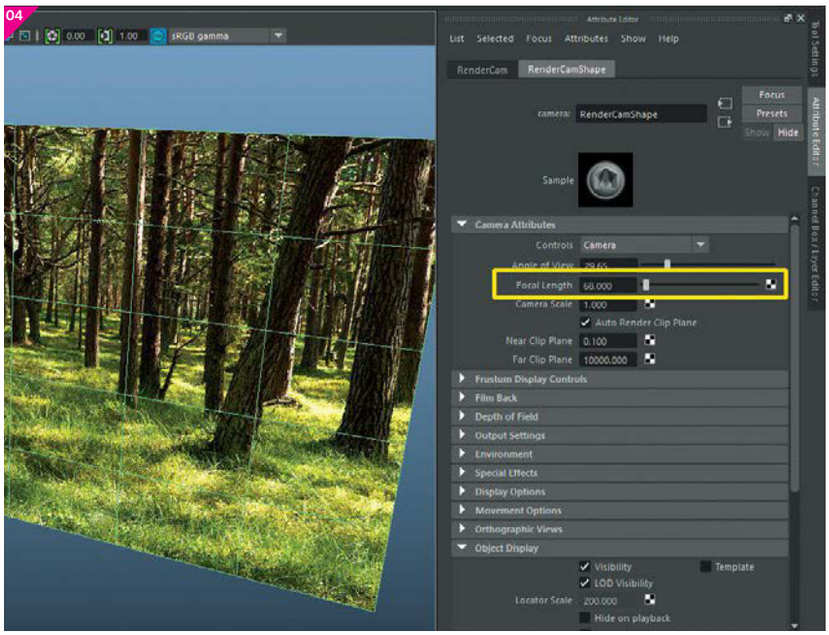
02 Prepare our HDR dome Let's bring our HDR dome into NUKE so we can inspect it in the viewer. In order to check the value range, hover the cursor over different areas of the image to slide the exposure control up and down. Our HDR dome is also larger than we need it to be so use a reformat node and create a more manageable sized dome with values like 6000 x 3000. Also remember to set the filter to Impulse. Next, create a write node and save it in an EXR format, which is much faster than HDR.



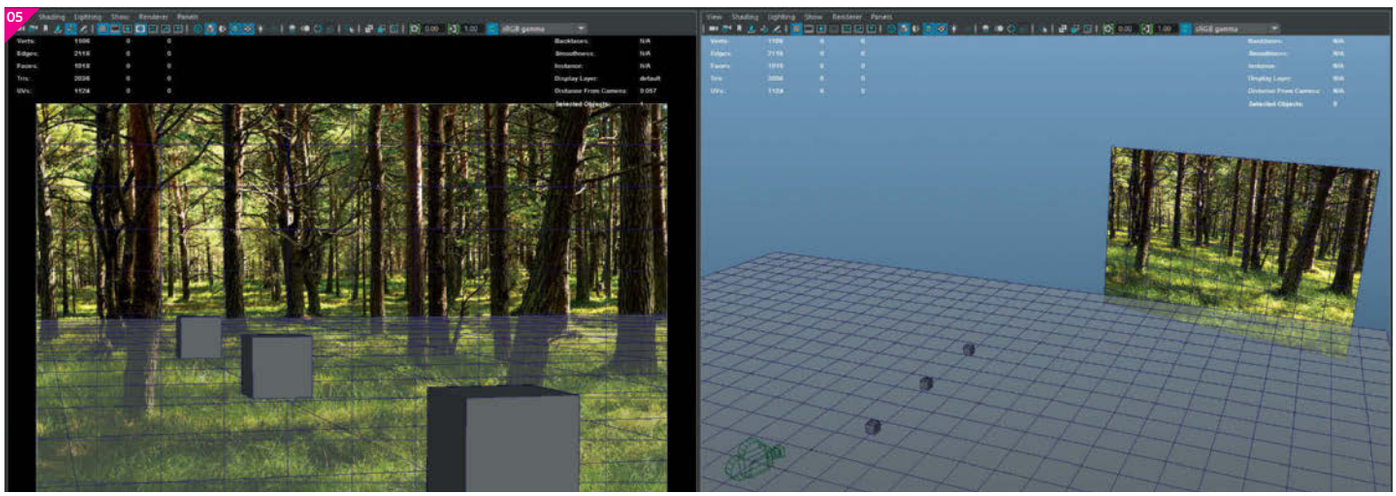


03 Set up our image plane The Maya Image Plane can have a mind of its own, so let's try a different approach. We'll create a polygon plane and rotate it 90 degrees in x. Now set the height and width to 5600 x 3700 to match our backplate. Let's run Planar UV mapping from the z axis. Next assign it a Lambert shader with the ambient colour set to 1, and everything else set to 0. We'll plug our working resolution backplate file into the colour slot. Now, in the polyPlane Render Stats, uncheck everything except Primary Visibility. Finally, let's freeze transforms on the image plane.

04 Lensing in camera matching Now create the RenderCam, but before it is moved grab the image plane, group it and parent it to the group underneath our new camera. Now our image plane is always directly in front of our camera. In the Render settings, set the render resolution to match our backplate, and then turn on the Film Gate on the render camera. With the camera selected, in the Attribute Editor, set our Focal Length. **HDRmap.com** conveniently provides the focal length used to shoot each backplate right in the image name. Our backplate was shot with a 68mm lens that was set in the Camera Attributes.

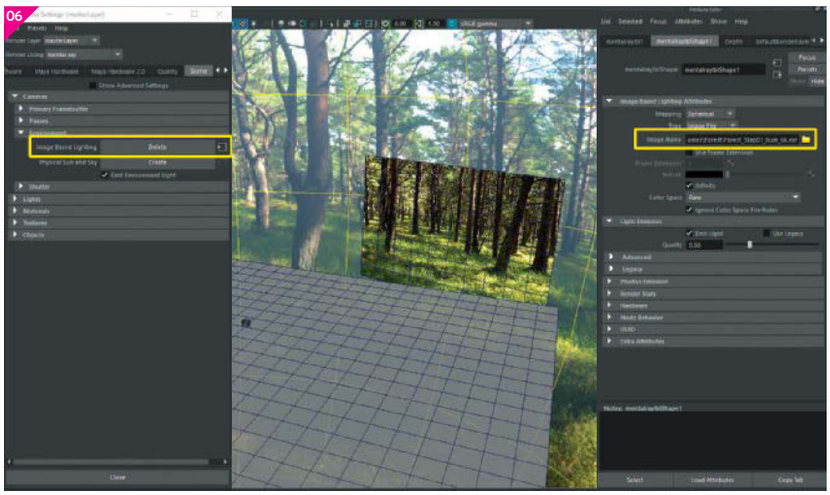


05 Work with perspective Select the image plane and use the Move tool with the axis orientation set to Object and move it to -5000 in z. We'll make sure it scales up in uniform to fill our film gate. Without measurements, and in a forest with uneven ground, perspective is an art more than a science. Create a ground plane at the origin and three cubes for the foreground, middle and background. Without moving our geometry, position the camera so that our ground plane is spread across the forest floor in our focal area, and the three cubes are resting on the ground.



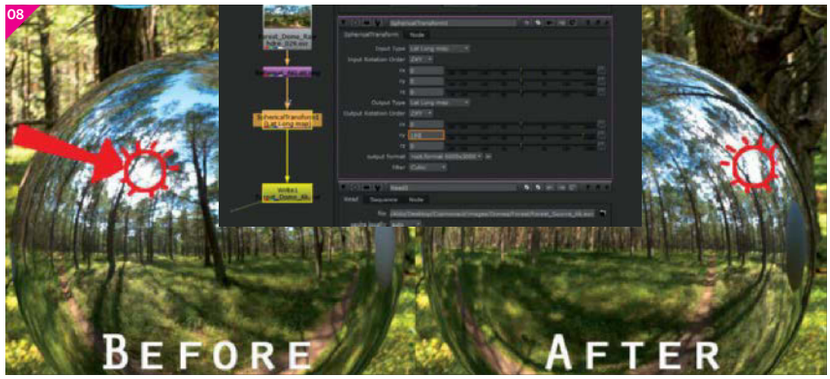
Working with metadata, reference and measurements

When capturing domes and backplates, photographers will often collect data to help the CG artist match lensing, white balance and perspective. In addition to common image attributes like bit-depth and resolution, an image's metadata can also include the focal length, exposure and f-stop, which can be viewed in NUKE with the ViewMetaData node. Other useful, but less common information can include measurements of the set, camera position, photographed cubes for scale and perspective reference, as well as the chrome ball, grey ball and Macbeth chart images for lighting and white-balancing. These are often luxuries, so here we'll focus on working with only the bare essentials.



06 Set up our image-based lighting We'll be using mental ray's native Image Based Lighting feature. In Maya 2016, create it by going to Render Settings>Scene tab>Environment dropdown. In version 2015 or older, this can be done in the Render Settings>Indirect Lighting tab. Mental ray will create the IBL sphere in our scene for plugging in our prepared EXR. Let's turn on Emit Light so that our IBL now has direct diffuse contribution. We'll also want an indirect diffuse contribution so go to the global illumination. When using mental ray 2016, use Final Gather Force mode. For older versions, Final Gather will work.

> Based on our backplate, we can figure out where the sun should be in relation to our focal point, and compare it to where it is actually reflected on our mirror ball



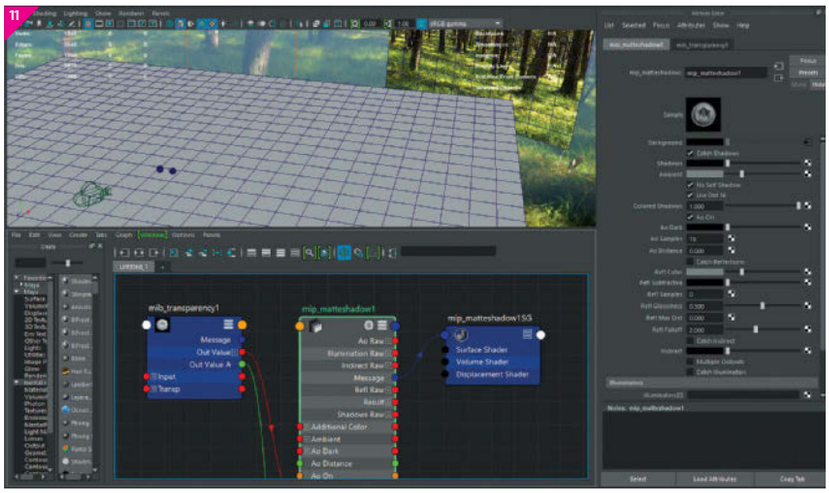
07 Evaluate reflections and illumination Let's create a mirror ball to evaluate how the dome is contributing to the reflections, and a grey ball to see how it is contributing to the diffuse illumination. Create a sphere with a 50cm radius and duplicate it. For the mirror ball create a MIA material with Diffuse Weight set at 0, Specular Weight set at 1, and the '0 Degree Reflection' in BRDF set to 1. For the grey ball create a second MIA material with a Diffuse Weight of 1 and the Diffuse Color swatch at 50 per cent and grey, with a Specular Weight of 0. Now run a test render.

08 HDR reflections and dome rotation The first thing we should do to evaluate our reflections is to look at the actual orientation of our dome. We want to be sure that the relative direction of landmarks reflected in the mirror ball matches up with the backplate – an easy way to do this is by using the sun's direction. Based on our backplate, we can figure out where the sun should be in relation to our focal point, and compare it to where it is actually reflected on our mirror ball. With a spherical transform node in NUKE and Input and Output Types set to Lat Long Map, use the rotate y value to adjust the rotation until our reflections line up right. If the dome also happens to be flipped, check the Flop box in the Reformat node to correct this.

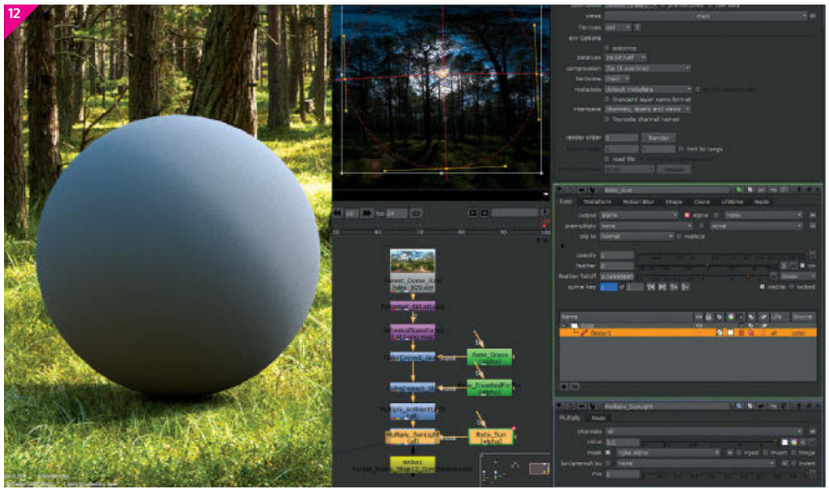
09 Get the white balance right Next thing to look at is how the overall colour reflected in our mirror ball matches up with the colour of the backplate. **HDRmaps.com** already white-balanced the dome and backplate image to match each other, so our colours are very close, but we may want to bring up the brightness and saturation of our grass a bit. Start off by creating roto nodes to mask off the sky from the ground to help control them individually. Then utilise ColorCorrect nodes to adjust the colour values for each of these sections individually.

10 HDR illumination and ambient light Let's look at our grey ball. Here we're evaluating the overall 'broad-stroke' brightness and seeing how it compares to the backplate. Typically, in a first pass-render, we'll see our grey ball looking significantly darker than it should. We know that our material is 50 per cent grey diffuse, so ultimately aim to make it feel 50 per cent grey in the render. This requires a combination of boosted ambient light and direct light, which we will cover next. For now use a Multiply node in NUKE to bring up the overall lighting value in our dome by about 1.5.

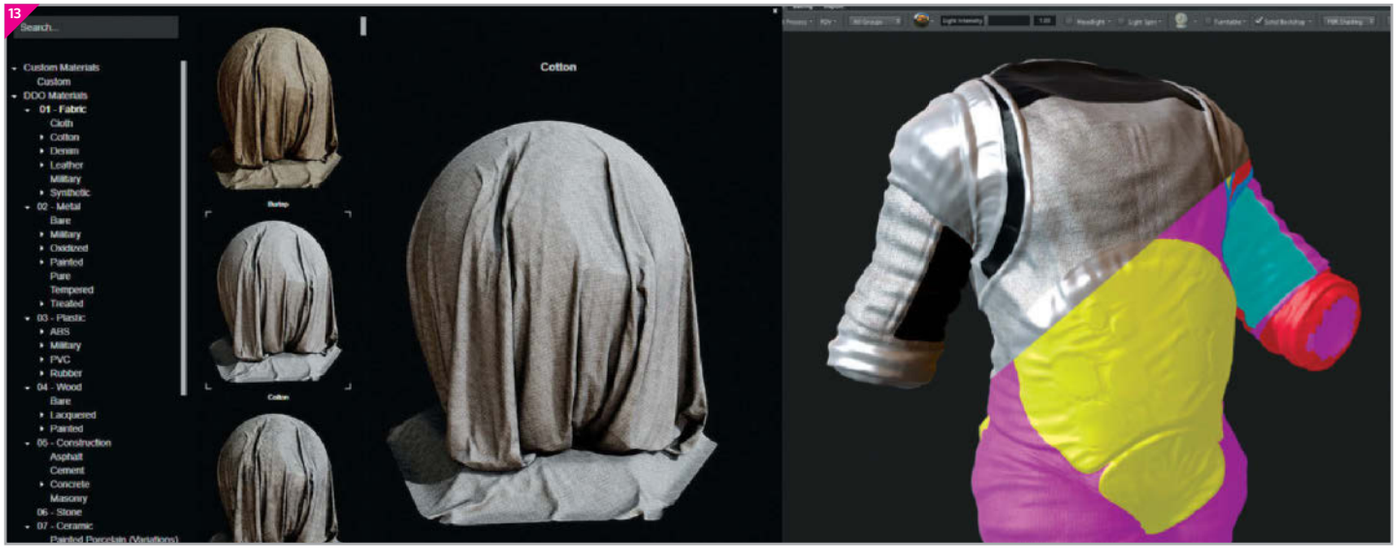
11 Position direct light Start by creating a shadow plane on the ground. In our hypershade we'll use the mip_matteshadow with a mib transparency plugged into the background attribute. Run a test render to evaluate our ground shadows. Shadow intensity is controlled by direct light intensity and boosting the direct sunlight values in our HDR dome will have two major effects. First, we're obviously going to see more light introduced into our scene, and second, we're going to see that ground shadows will start getting darker. Let's start by dropping our exposure slider in NUKE Viewer and creating a very small roto around our sun.



12 Create shadows With our sun roto created, let's use it as a mask for a new Multiply node to control the sunlight. Hover the cursor over the sun in the viewer to get a reading of its RGB intensity. Typically, we'll have to boost the sun values drastically to get into a realistic range. Matching our shadow darkness with the backplate shadows will typically require values into the several thousands. Matching how soft or crisp the shadows are is dependent on how tight or feathered the sunlight is. Because of the leafy canopy in our forest, our sunlight is fairly spread out, so we want to replicate that effect with a wide feather on our roto.

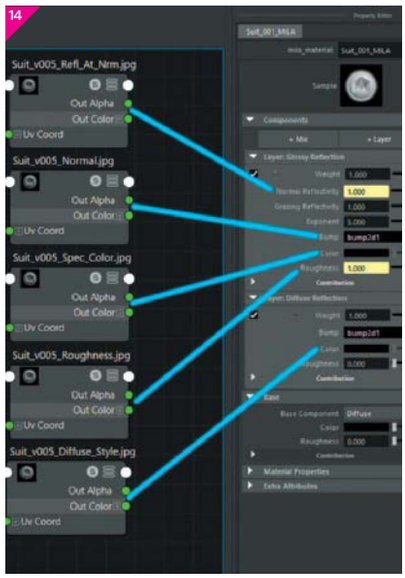


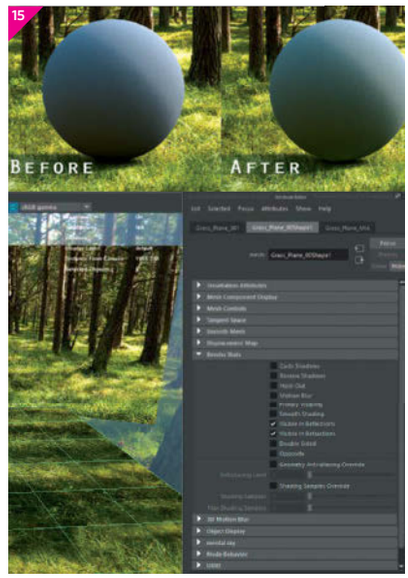
13 Physically based textures We will be using mental ray MILA shaders, driven by textures from Quixel SUITE 2. These textures are generated from real-world scans and come precalibrated to work with our shaders, so it's a great way to build accurate materials very quickly. We'll create material ID maps for our models to designate which materials go where. We can plug our UV model into Quixel's DDO Painter and quickly start assigning materials from the Smart Material Library to the different colour-coded sections of our model. Once all of our smart materials are assigned we can use the Exporter tool and set our Export Profile to Arnold.



Mental ray production shaders

We'll be using some neat shaders in mental ray that are not visible or accessible in the Hypershade UI by default. These are the mental ray mip production shaders. Before we unlock these shaders, let's be sure to save our progress, exit our scene and open up a blank Maya scene. Now we can expose the production shaders by typing the following in the MIL command line 'optionVar -intValue MIP_SHD_EXPOSE1'. Now we can exit and restart Maya and the MIP production shaders will be accessible through Hypershade.





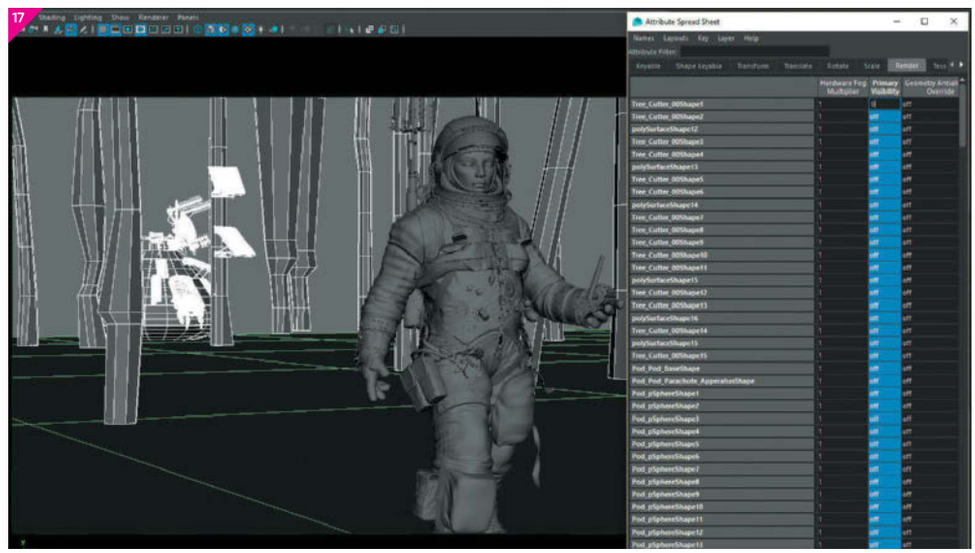
14 Build our MILA materials Quixel SUITE 2 will generate a set of five maps for us: the Diffuse Colour, Normal, Reflectance at Normal, Roughness and Specular Colour. We will start by opening our Normal map in NUKE or Photoshop and then flipping the red and green channel. Now, in Maya create a new MILA material. Let's set up the Diffuse colour to black on the base layer, and create a New Weighted Diffuse layer and a Custom Glossy Reflection layer on top. Now we can start plugging our appropriately-named textures into their corresponding slots on the shader. The real-world scanned data from the Quixel SUITE 2 material library will be driving our materials.

15 Add bounce light For more bounce light we can create a ground plane with only 'Visible in Reflections' checked in the Render Stats. In Photoshop, make a roughly tiled texture of the ground in our backplate. Then in Maya, create a MIA material and plug our ground texture into the Diffuse colour. We should give it a Diffuse weight of around .9 with a Specular weight of 0. To avoid any hard edges in the reflections, create a ramp and plug it into the MIA Cutout Opacity. We'll set the Ramp type to circular with a smooth interpolation, and adjust the values to be white in the centre and fade out to black around the edges.

16 Integrate depth Let's create some simple geometry for the trees in our backplate. This will help for overlapping CG elements and for including the trees in our depth pass. Now create a simple eight-sided cylinder at a rough size for our trees. Looking through our RenderCam we can make some duplicates and move them back into the scene in the x and z axis, lining them up with the trees in our backplate. We can then make simple vertex adjustments to approximate the tree shapes. In the Render Stats we'll turn off everything except for Primary Visibility and assign these a surface shader with the Out Matte Opacity set to 0. We'll composite this depth pass in Step 19.

Quixel SUITE 2

The DDO painter in Quixel SUITE 2 is intuitive and very easy to pick up, especially for artists who are already familiar with Photoshop. Though we don't have room to go into more detailed instruction on the Quixel SUITE texturing process here, there is plenty of excellent documentation available to help you quickly create physically accurate textures and materials for your CG assets. Also remember that in order to accurately preserve the real-world data from our Quixel textures, we need to pay attention to our colour management and make sure we're employing a linear workflow.

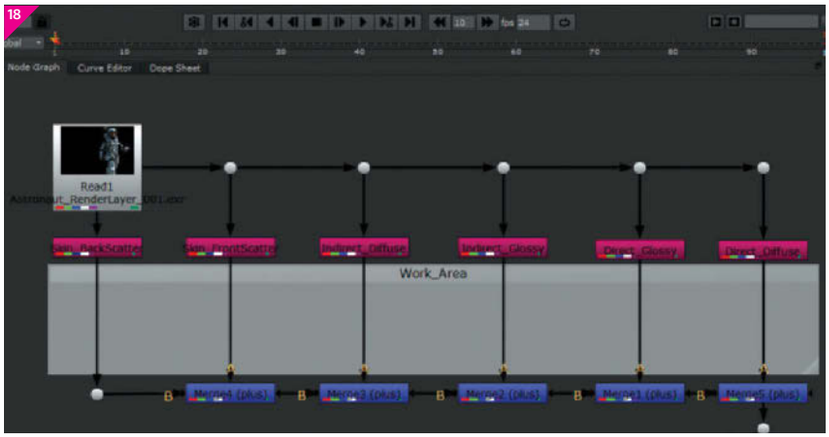


17 Render passes and render layers With our material contribution passes, let's include depth, normal and occlusion passes. Mental ray lets us select these in the Passes section of the Render settings. We'll also create render layers for each of our 3D assets and their ground shadows. For our astronaut, we'll duplicate our master layer and select everything except the astronaut. Now go to Window>General Editors>Attribute Spread Sheet. In the Render tab, we'll select the Primary Visibility column and set it to 0. Now only our astronaut is visible in this render layer, without losing any reflections from other objects in our scene. Let's repeat this to create render layers for our pod, the solar panels and the ground shadows.

18 Composite our passes Let's bring our astronaut render into NUKE and look at the passes. We have our Direct Diffuse, Indirect Diffuse, Direct Glossy, Indirect Glossy, Front Scatter and Back Scatter channels that together add up to the final beauty pass. Create six Shuffle nodes to shuffle out each of the passes from the EXR. Now add the passes together by piping them through a set of Merge nodes that will then be set to plus. At the last merge node, our combined image is identical to our original beauty pass! So you can simply adjust each pass individually in the segments between all of the Shuffle and the Merge nodes.

19 Integrate depth of field and other effects To add depth of field bring our depth pass into NUKE and soften it with a Blur node set to 2. Now shuffle the R channel into the Alpha and then pipe it through an Invert node. Next pipe our image through another Blur node set to 5, and plug the mask pipe to our Invert node to achieve a lens blurring effect. We can control the focal length by adjusting the White and Black Point on our depth pass with a Grade node, and we can control the intensity of the effect in the Blur node.

20 Retouching Once we're done adjusting our passes, write out the composited image and open it up in Photoshop to add finishing touches. To bring the viewer's eye back to our astronaut, use an adjustment layer with a layer mask to bring down the saturation in the background. Add a quick vignette centred around our character with a circular gradient on an overlay layer and a low opacity. Now add an ambient occlusion layer set to Multiply to push model details. Finish with subtle environmental effects like air particles, light rays and a warm photofilter layer.



Cameramap bounce light

Alternatively, we can use the mip_cameramap to project our backplate image onto our ground plane and enable our global illumination to grab light and colour directly from the backplate image. We can create a mip_cameramap and plug it into the background attribute on our shadow plane's mip_matteshadow. We'll be using our backplate image as the map. Now turn on 'Per-Pixel Match', Transparent Alpha and 'Offscreen is Environment'. This would also give us light and colour bouncing up off our green forest floor, and we can control the intensity via the multiplier attribute.

All tutorial files can be downloaded from: **filesilo.co.uk/3dartist**

Elevate Your Workflow with Dedicated Rendering

renderPRO

Render or simulate at your desk or on the go because the versatile renderPRO is configurable with up to two Intel® Xeon® processors (28 cores) and requires only power and a network connection.

renderBOXX

The ultimate cornerstone of your render farm, renderBOXX features dual Intel® Xeon® processors (up to 36 physical cores). Ten modules fit neatly into a 4U (7"x19") space and IPMI 2.0 technology with KVM over IP provides the finest in network management.

RenderFarm on Wheels

Available in a wide range of sizes and expandable to over 80 modules (2880 cores), ROW is the ultimate turn-key render farm featuring rack-mounted, dual CPU render nodes housed in a mobile enclosure.

BREAKING NEWS

Introducing the World's **Smallest**

Overclocked & Liquid-Cooled Workstation

APEXX 1

For more information on BOXX rendering solutions, visit:
www.boxx-tech.co.uk OR call 01256 378000

BOXX Centerprise INTERNATIONAL

"Intel, the Intel logo and Iris are trademarks of Intel Corporation in the U.S. and/or other countries."

Light a night city scene in Blender

Render an urban night-time environment, using Seoul as an example, and master depth and glossy surfaces with Roughness maps

GLEB ALEXANDROV
Big City Sensory Overstimulation, 2015

Software
Blender, Cycles

Learn how to
- Set up lighting in a complex urban environment
- Create advanced materials using Cycles
- Use Roughness map and other tricks
- Render a large project efficiently (and reduce the noise in Cycles)
- Spice up the final image with post-processing

Concept
The concept of this work was based on a bunch of photos from Flickr and Pixabay. I picked and combined the parts that I liked from my library of night city photos.

Have you ever tried to create a night city in Blender? The kind of city that is filled with shining billboards, shop windows and advertisements? Then you know how hard it is to set up believable lighting for such a scenario. And speaking of rendering... it could be easier to just fly to Beijing and take a photo with your old Canon.

The list of potential roadblocks is endless: the I-don't-know-where-to-start problem, the over-bright-highlights problem, the it-doesn't-look-real problem and the Cycles noise is icing on the cake. So how you can approach the lighting and rendering of a night-time urban environment?

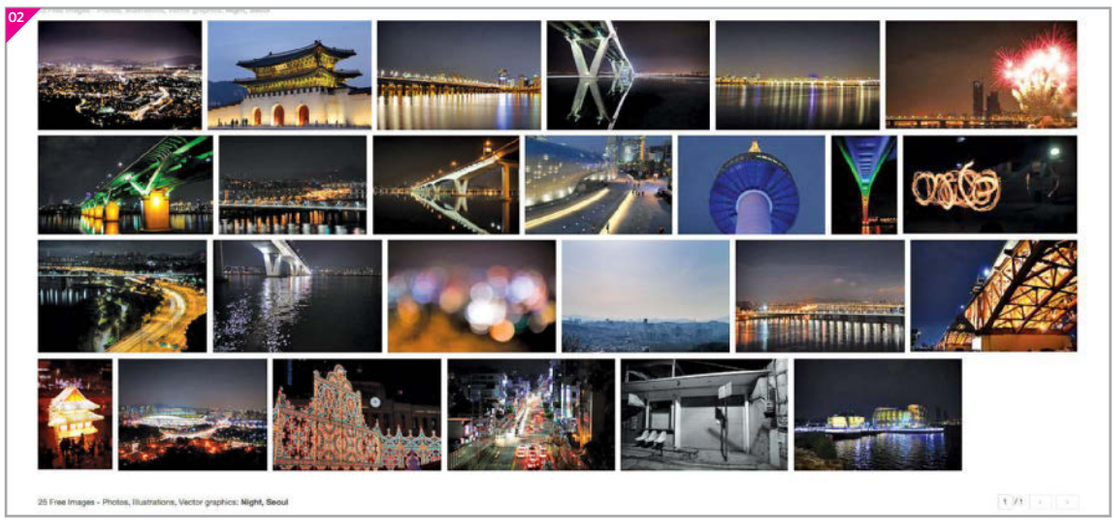
In this tutorial we'll show you a few tricks that will help you to master this skill. Step by step we'll go through the whole workflow and assume that you have a basic scene to start with. First you'll learn why finding great references is essential. Then we'll jump into setting up the lighting and we'll be creating a gigantic layered pie of emissive surfaces – it's very tasty if done right. The next step would be to look through the materials and their settings. You'll learn why breaking the laws of physics can be a good thing and how wet asphalt, and the use of other reflective surfaces, can drastically improve lighting.

Finally you'll discover how to render and post-process the image. If you take just one thing away from this tutorial, hopefully it's this: don't be afraid to go over the top with lighting in a big city.

You can get ideas from all sorts of places, for example it could be an article written about mental health, where someone described her overstimulation while visiting a mall. She said, "Then my visual perception would shift and it was like everything within my visual range was reaching toward me." Lighting in a city at night is all about overstimulation too.

01 Prepare the scene for lighting So you modelled a city block. Now you can get started with preparing a clean environment for lighting. Remove the distractions so you can concentrate. Complete the models and put the finishing touches to the composition. Take your time. It's essential to have all the content in place when you start setting up the lights. Imagine you're building a stage for a movie. An hour later you will pass it to a lighting artist. What a lucky coincidence that you wear the hat of the lighting artist!

02 Collect the references Now it's time to browse through the references of the crowded urban environments on Flickr or Pixabay. Having a great reference makes your life so much easier, because you have something visual to feed to your brain. It will enable you to obtain a vocabulary for night city lighting. Search "Night Seoul" and you'll get dozens of delicious references. You'll see glaring shop windows, paper lanterns, adverts of crazy shapes and much more. Just don't forget to dump it into a special folder.



YOUR FREE DOWNLOADS
from **filesilo.co.uk/3dartist**
- Tutorial screenshots

If you take just one thing away from this tutorial, hopefully it's this: don't be afraid to go over the top with lighting in a big city

03 Feel the vibe of the massive urban environment at night Imagine the gigantic city that exploded with flashing, blinking and strobing advertisements all around you. Imagine famous scenes, like the city that looks like the shopping mall in the photo by Andreas Gursky (99 Cent II Diptychon). Maybe you'll remember the environments from *Blade Runner*, or something else like *Duke Nukem*. The point is to feel the mood. Look through the references that you collected and ask yourself: "What do I feel? What is special about the lighting?" What is interesting is that the large city lighting scenario will be hard to analyse. Why? You can't tell the direction of light. Who cares about the direction when the light spills from all angles at once? If nothing helps and you still don't feel the mood, prepare yourself a cup of double espresso. Now you can get straight to setting up the lighting.

04 Create lighting in layers You can safely assume that the whole city is a giant light source, like a gargantuan garland. There will therefore be no three-point lighting this time, just a dozen of individual lights (we ended up creating a scary number of the emissive objects and other types of lights including background matte painting). Let's work in layers. The process for each layer starts with adding the light source or the emissive object, then tweaking its texture or a throw pattern, testing how it influences the scene (if you can't see it clearly, isolate the light), and optimising it (by cutting down the number of bounces in Cycles). The aim is to stuff the whole cityscape with lamps, advertisements and other shiny things. With that in mind you can work on one step at a time.

Be creative with your keywords

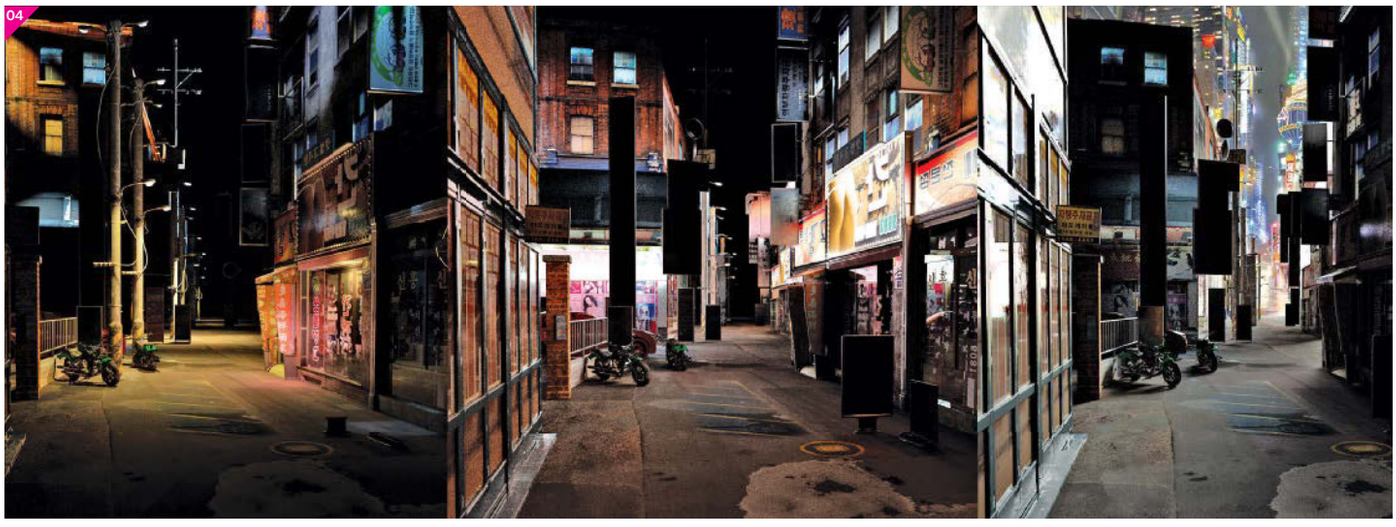
When searching for the references, think outside of the box. Obviously you are not limited to Pixabay and Flickr. Have you ever heard about Lomography (**lomography.com**)? It's a community that is into retro-looking photography and exotic devices like the LOMO LC-A camera. If you search on Lomography, I bet you'll get a new perspective on night city lighting. When I said references, I didn't just mean looking at photography but also looking at digital art. Extend your search to Artstation (**artstation.com**), CGSociety (**cgsociety.org**) and other online galleries.

03

05

05 Use the emissive shaders Cycles (Blender's raytracing-based render engine) has two types of lights: the invisible lights, like a spotlight, and the mesh lights. The mesh lights are the objects with the emissive shaders. Like its name suggests, the emissive shader makes an object emit light from its surface. This is as close as you can get to the real light behaviour and you can call it physically correct lighting. Every billboard and every other blinking and strobing thing in the scene can use the emissive shader, so go ahead and add some!

04

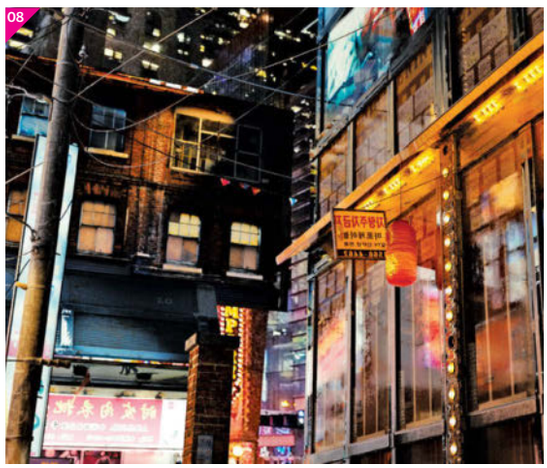


06 Add some more lights! When you think you're done, add some more lights! Why? Because we are aiming for sensory overstimulation like the lighting seen in Seoul, Beijing and New York. So you can't go wrong with adding a bunch of lighting details on top of your initial setup. What could this be though? It could be the paper lanterns shimmering in the air, garlands behind the windows or smartphone displays... You get the idea.

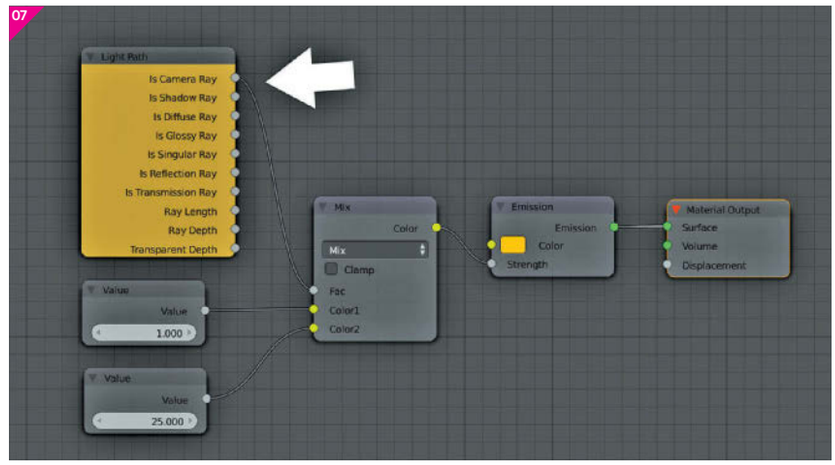
07 Use Light Path node to control the brightness Have you ever wondered how to make the emissive object brighter without making it way too bright? In other words, how to stay within the dynamic range no matter what? By making use of the Light Path node you can break the emissive object into two parts: the light that is emitted and the look of the object (ie what the camera sees). Thus you can control the brightness of the object without compromising the amount of light it emits!

06

08

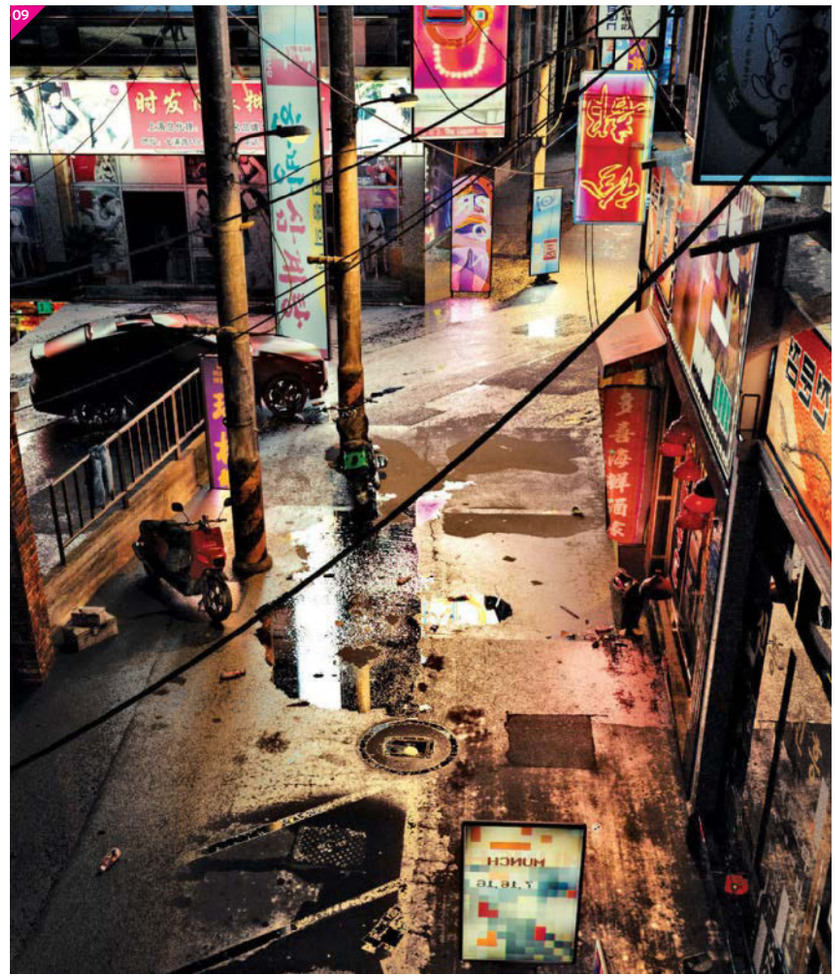


07



09 Create awesome reflective materials using non-physically correct values So you transformed the scene to make it look like it rained a few hours ago, but what can you do if the reflection doesn't look right? For example, if you want it to be much, much more dazzling? Use the Math node to multiply the reflections (you are going to use the Add operation). This will push the reflections over their physical values. It's cheating, but you know what? It doesn't have to be physically correct here, it just has to be aesthetically appealing.

09

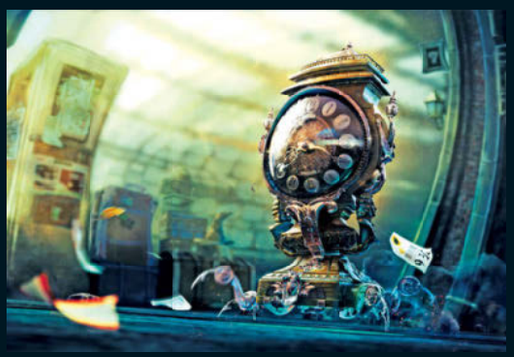


08 Enhance your lighting by adding glossy surfaces This may sound obvious, but think about it – when you add mirror-like objects in your scene, you crank up the amount of light that reaches the retina. In cinematography you see this trick all the time. They just pour water on asphalt to make it reflect the street lamps, it will look gorgeous ten times out of ten. So go ahead and add puddles, glass panels and other glossy stuff. Pour the water on the asphalt. Now what if you want to make the reflections even more prominent? Let's take a look at the next step for that.

Showcase

Gleb Alexandrov

The founder of the educational blog **creativeshrimp.com** and a digital artist, Gleb's work has received numerous awards including Best Concept Art of the Year and has been published in magazines and books.

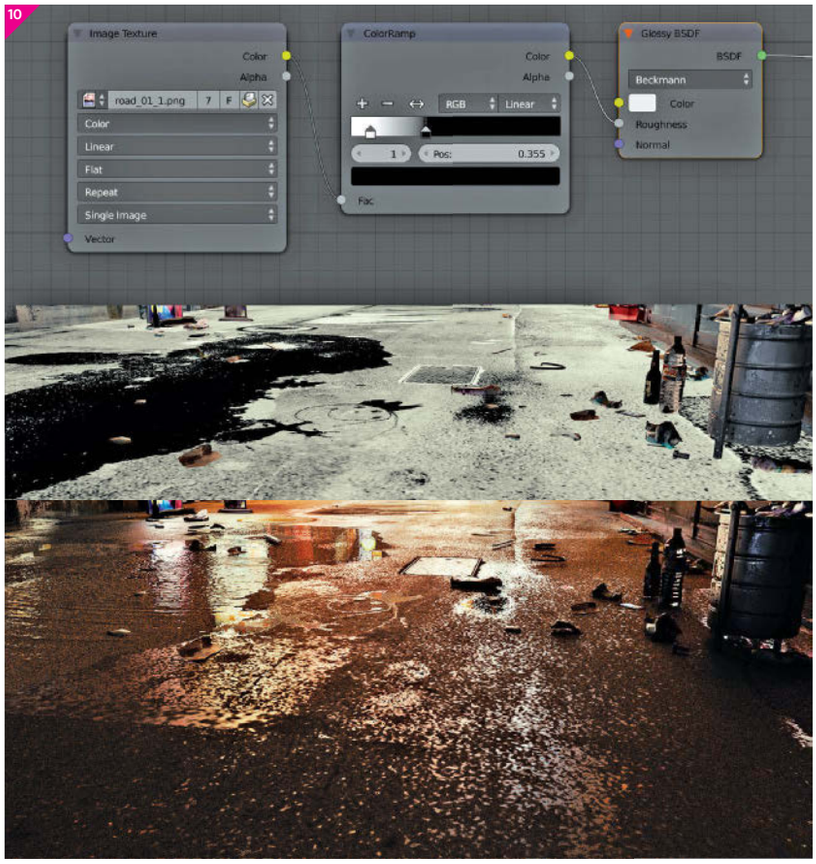


The Magical Clocks and Where To Find Them
Blender, Cycles (2015)
A magical clock (or maybe a fantastical beast?), made using Blender and rendered in Cycles. Production time: two weeks. No wizards hurt. Sharing among muggles is encouraged.

Alchemy
Blender, Cycles (2015)
This render was created for the website: **Poliigon.com** (available from 2016). I aimed to reveal the microscopic details on every surface, while keeping the image photoreal.

The Personality of the Lamp
Blender, Cycles, Photoshop (2015)
Every lamp has its own personality. That's what I found while writing the chapter 12 for *The Lighting Project* book, my manifesto of think-different approaches to lighting in computer graphics (**creativeshrimp.com/book**).

10 Use the Roughness map The variable roughness is the secret ingredient that adds depth to the reflective surfaces. We'd like to emphasise this process: mastering roughness is super important when you work with physically based rendering. Just by manipulating the roughness map you can dramatically change the look of any reflective surface: ice, rusty metal, mud, water, wet asphalt, you get the idea. For example the wet asphalt that is in your scene is a nice showcase of the variable roughness. Some parts are perfectly glossy (like with puddles), some are very rough (for example, the dry parts) and there are transitions between them.



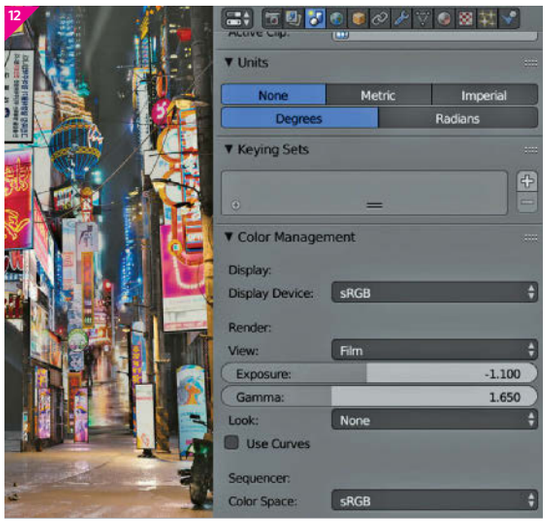
11 Use the Mix shader to its full potential The materials that exist around you in everyday life are very complex. To mimic this complexity you can use the Mix shader. For example, even though the street advertisement is mostly emissive you can spice it up with a glossy finish, as if there is a layer of a thin glass on top of it. Conversely, you can add depth to the window glass material by blending in the room (just an emissive shader). Every type of substance has hints of a different substance. The Mix shader allows us to achieve a really believable look. The devil is in the details.

HDR and tone mapping

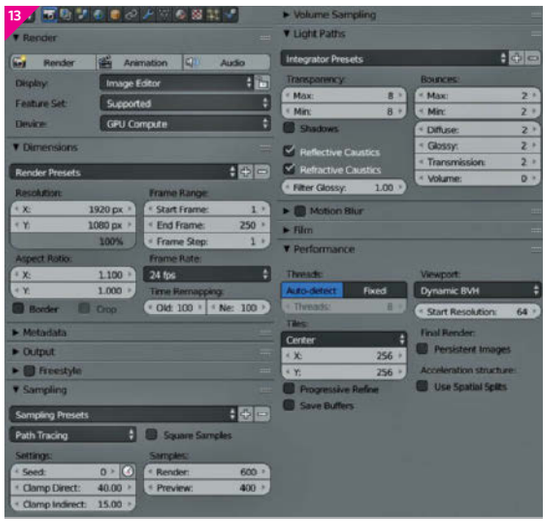
Use tone mapping sparingly. Of course, you can aim to display a full, glorious luminosity range. It will give you the maximum details in the shadows as well as in the bright areas. At the same time, it will ruin the being-blinded-by-the-light impression. It will ruin subjective intensity and contrast because even in real life, your visual system often fails to adapt to extreme lighting conditions. Some imperfection in tone mapping is okay! A burned-out look is okay. Don't be afraid to lose a tiny bit of detail in the shadows or highlights. That's why I love the film emulation functionality in Blender. And that's why I'll devote a whole chapter of my *Lighting Project* book to tone mapping.

12 **The film emulation** In analogue photography, every film responds to light in a different way. Some films clip the whites, some wash out the blacks and some types of film surprise us with a weird colour tint in the mid range. You can create your own type of film by enabling film emulation in Blender and tweaking the RGB curves. You will see the effect right in the viewport. Film emulation will make your render look less perfect and less digital so, as mentioned earlier, be willing to sacrifice some details in the shadows.

12



13



13 **Render settings** You rarely need more than two light bounces, and even the second light bounce is often overkill. It has a microscopic influence on the global illumination and at the same time it makes render times skyrocket. So start with setting the max bounces value to 2. Only when there are many reflective objects that reflect each other will you need to raise the maximum number of bounces. Also you can set the Filter Glossy to 1 to reduce the noise in the glossy materials. Another crucial thing when rendering the night city is the Clamp parameter. The Clamp will allow you to kill the fireflies (or so called hot pixels) that go over the certain threshold. As a side effect it can dampen lighting brightness, so proceed with caution. Try setting the Clamp Indirect to a value between two to 15 to see how it affects the scene. And of course you can disable the Caustics altogether if it generates too much noise.

14

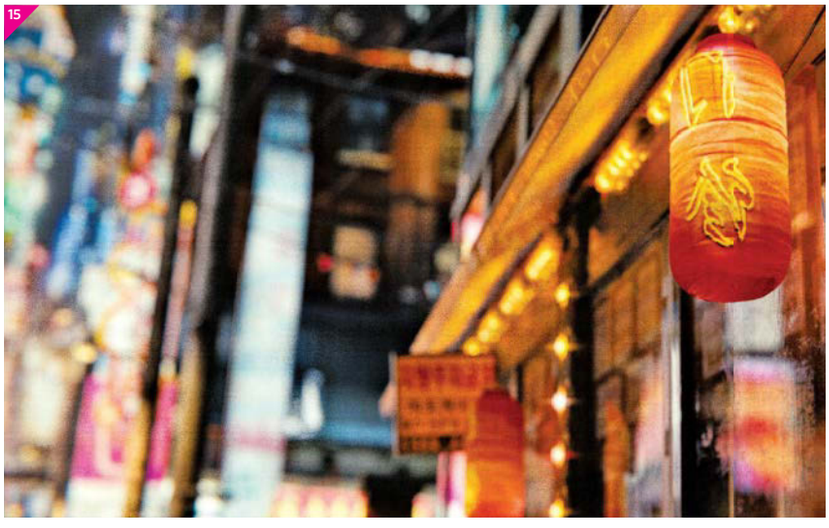
14 **Don't be lazy and rework some parts** It's sad but true: often you have to make changes and render again and again. If you feel that something is off with the image, don't be lazy – spend more time working on your scene. Add something to the foreground to enhance the composition depth. Flip the image horizontally and see if it's still balanced. Ask your friends to critique the render (but try to take a deep breath and stay calm). Good rendering is always an iterative process. Only when you are 100 per cent satisfied with what you see should you proceed to the post-processing.

Render additional angles

You created a dazzling image, but you can take it even further by rendering a few additional angles! I almost always start with creating a close-up shot. It's easy to set up. You can use the camera depth of field to blur the background and focus the viewers' attention on some object. For the portfolio it's beneficial to have the series of images representing a location. The viewers will love it.

15 **The post-processing stage** Let's work on the finishing touches. Barely visible things like scratches and grain give a subliminal boost to what we call photorealism. You can rarely see these effects when looking at the final image, but it's important to have them. For the post-processing part, you can work on film grain (or ISO noise), light leaks, lens effects and chromatic aberration. Apply these defects to take your render to the next level and call it a day. You created a splendid night city and now we're dying to see it. It's your turn. Post it to online galleries. Share it with the world.

15



Professional products for your successful event

EVENT WRISTBANDS TYVEK®

Red, with adhesive seal, numbered twice
incl. removable section, 1/0 single sided print

250 copies	400 copies
£36.00 GROSS	**£43.88 GROSS**
£30.00 NET	£36.57 NET

POSTERS

DIN A3, 100gsm gloss art paper,
4/0 single sided print

100 pieces	500 pieces
£30.50 GROSS	**£36.12 GROSS**
£25.42 NET	£30.10 NET

Discover more at
flyeralarm.com

FLYERALARM

Our experts

The best artists from around the world reveal specific CG techniques

Clarisse

Rainer Duda
rainer-d.de

Rainer has over a decade of experience in VFX and specialises in advanced shader techniques

3ds Max, ZBrush

Gustavo Åhlén
facebook.com/gustavoahlenstudio

As the founder of Svelthe, Gustavo is also a professional 3D/VFX designer and matte painter

Quixel SUITE

Matthias Develtere
develteremattias.wordpress.com

Matthias is 23 years old and is currently employed as a junior 3D artist at MachineGames

Maya

Amaru Zeas
amaruzeas3d.com

Amaru is a 3D artist based in Seattle. His attention to detail has helped him become a passionate artist

YOUR FREE DOWNLOADS
from **filesilo.co.uk/3dartist**

- Tutorial screenshots
- Video tutorial
- Clarisse files

Texture skin with subsurface scattering

The process of rendering humans with realistic skin using a minimal amount of texture support and procedural effects is a fascinating subject. We will be learning how to use subsurface scattering to create human skin in Clarisse in this tutorial, but first we need some files.

The head is a freebie that can be downloaded from Ten24 (3Dscanstore.com). For the light support we need a HDR map, which is free as well and can be downloaded at hdrmaps.com under its freebies section. We set up the Clarisse scene with the downloaded files and started by creating a clear folder structure. Afterwards, we just imported a few textures from Ten24 and worked directly on a freshly created standard material. This is also the core of this tutorial as it is important to understand the different components of a standard material and how they all affect each other in the scene, without exporting too many passes and comping them together externally. The initial idea is to keep the final image creation in Clarisse. To warm up, we will add the Diffuse map to the material and set up the Bump map correctly.

The next point in our journey will see us investigating the specular reflection followed by the main reflection components. We will work with maps and adjust glossiness values for each section. Instead of using a fresnel map we will use fresnel BRDF behaviour. The fresnel reflection falloff gives us realistic reflective behaviour and avoids an artificial look. The Fresnel Brdf function works in combination with the index of refraction parameter in the transparency area.

The realistic look of the human head will be achieved via the addition of subsurface scattering, and so we dig into the advanced subsurface scattering functions of Clarisse. There are actually two functions that we will use in combination. With a single SSS intensity, only rays from direct lights will be taken into account when it comes to calculating rays under the surface. Diffuse scattering, the next function used, takes non-directional lights into account by using calculations – basically, it approximates light that bounces several times under the surface.

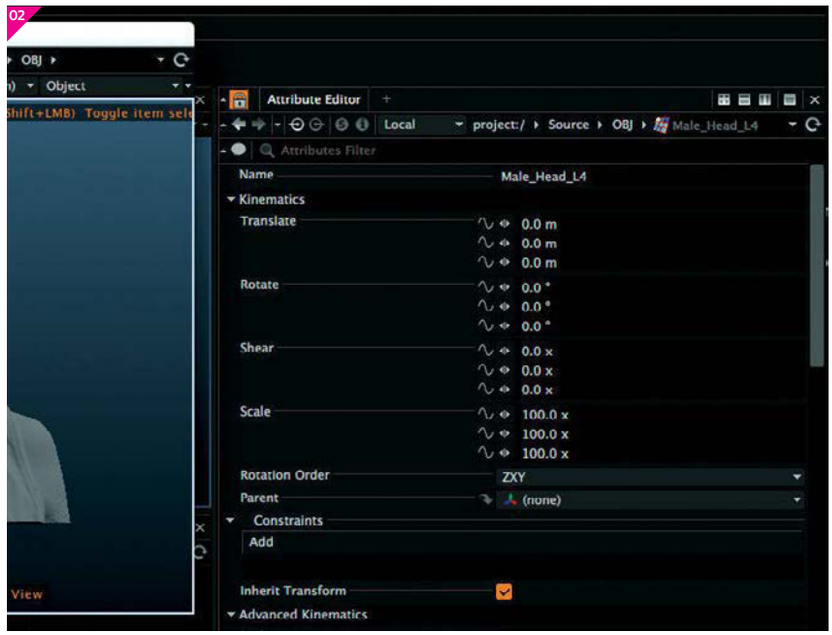
Before we start the final rendering we will adjust some more SSS values like the thickness of the surface, which is really important for the visual look as well as for the index of refraction. At this stage you should be able to create stunning renders in Clarisse with human skin.

01 Add our working files The first step is to set up our project files in Clarisse, therefore we import the male head OBJ file into the OBJ folder in the Source context (context is a folder in Clarisse terminology). In addition we must import four textures into the Textures context under Source: the Bump map, Color map, Reflection Amount map and Specular Amount map. To import files, go to File>Import. The texture map file function is for the textures and geometry of the OBJ. Under the Scene context there's an HDRI context, and inside of this is where we will import the free HDR file.

02 Work on a proper scene setup Now that we have all our files in place it's time to prepare the scene. At first we assign the HDR map to the environment light by selecting the light object in the Scene context, afterwards in the Attribute Editor we must scroll to the lighting area. In the texture slot point to the map file. Next, scale up the OBJ of the head. Now we can select the mesh, jump back to the Attribute Editor and scale it 100 times under the Kinematics tab – just so that we have a bigger mesh. By pressing F in the viewport we can jump to the mesh.

03 Create skin material Let's create a standard material in the Source context. With a right-click, open the Tool menu in the empty space next to the project structure. Under New go to Material and then pick the standard one. Now rename this to 'Male_Head' and assign it, via drag and drop, to the mesh. There are actually two ways of working within material properties in Clarisse. You can use the Attribute Editor on the right-hand side, or you can open up the Material Editor as a new window and this will enable you to work on a node-based graph system.

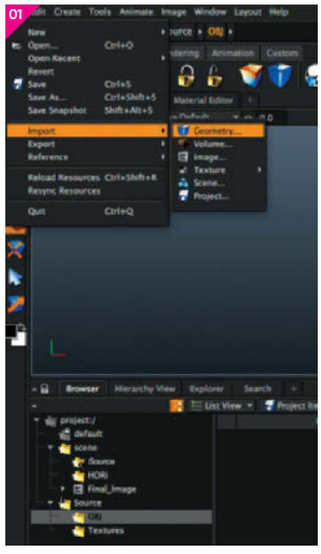
04 Add specular and diffuse components Now select the material and jump to the Attribute Editor. Our first target is the diffuse component. Under the shading area, select the small checker board icon in the diffuse line. In the new window simply go to the Textures context and select the Diffuse Color map. We do the same procedure for the specular component under Specularity with the Specular Amount map. In addition we change the glossiness as this will give us a bigger specular highlight – we can use a value of 10 per cent which will look more natural on the skin later on.

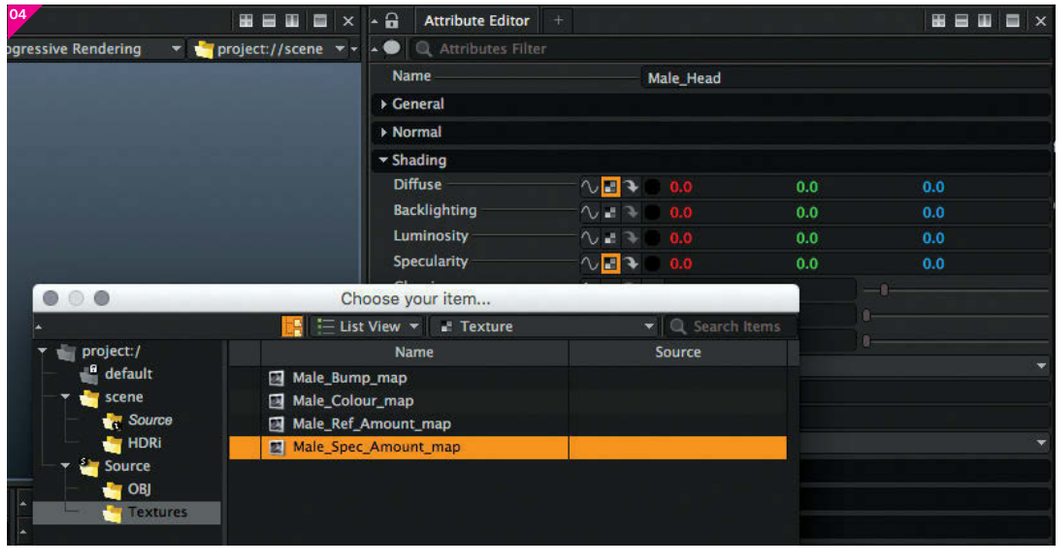


> Change the glossiness as this will give us a bigger specular highlight

Identify noise generators

Sometimes rendered images appear with a lot noise but where does it come from? To identify what causes the noise just deactivate the SSS. The golden rule is: if there is no noise in the diffuse then the lights must be undersampled. Of course you can raise the SSS quality sampling, but be aware that the cost is actually higher than simply raising the light quality by selecting the light and raising the sampling values. Improving the light quality during SSS means that the costs are ten times higher. Choose wisely which values you want to improve.



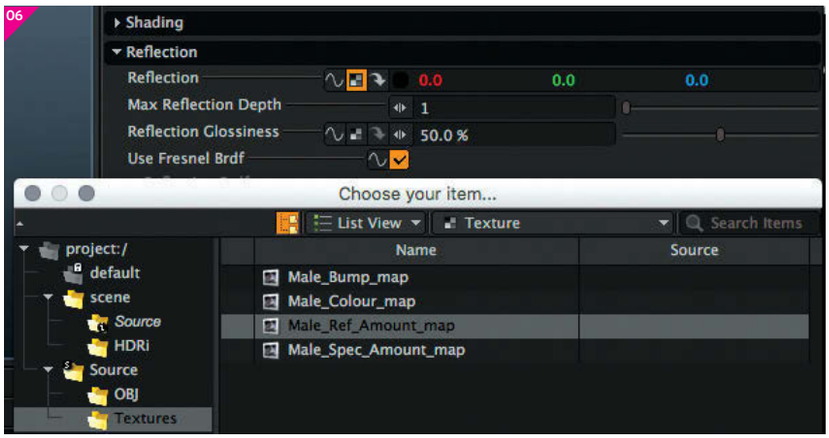


05 Bring the Bump map into place The next component that we have to adjust is the Bump map. Under the line bump we add the Bump map first. Another important value we have to take care of is the bump intensity in the same line. We scaled the head up about 100 times so we have to make sure that we put the correct value in there. For this workshop we use 1.5cm, and this will give us a reasonable look for all the skin details without too much visible noise from the 3D scan. If you use a self-made map from a high-poly go for high values to increase the look and feel of the skin.

06 Fresnel reflection for more realism Our journey brings us to the Reflection field, just below the Shading parameters. We bypass the reflection colour by assigning the Reflection Amount Map as input. We keep the Max Reflection Depth at 1 but we change the Glossiness to a value of around 50 per cent. The lower you go with the percentage, the blurrier it will be. Last but not least we activate 'Use Fresnel Brdf'. The only way to make your reflection not look artificial is with the use of fresnel blending for natural-looking reflections.

07 Final touch for the reflection Activating the 'Use Fresnel Brdf' function basically activates the BRDF dielectric model, which is automatically computed according to the camera ray incidence angle and to the index of refraction – this is the interesting part of using this feature. Usually this feature is perfectly suited for refractive materials but of course you can use it for reflections as well. To get a great visual result we have to set a higher value of the index of refraction within the transparency area. For this workshop we use a value of 2.

08 Activate the SSS magic Finally we can move on to the subsurface scattering area, where we first activate it by setting the flag to true. Subsurface scattering is responsible for the simulation of light through translucent surfaces. The light is scattered and reflected several times before it exits the surface again. Clarisse has two functions which will help us with this kind of behaviour. At first we will take a look at the SSS single scattering, which only takes directional lights into account when it comes to the calculation as mentioned earlier, and here we set a value of around 60 per cent.



Improve image quality with SSS

The Clarisse render engine avoids ray explosion and heavy computing times by recycling rays as much as possible, which can lead – in rare cases – to poor sampling. Therefore, you can increase the SSS light oversampling when there is no noise in the diffuse – if necessary. This attribute basically enables you to control the number of samples used by SSS samples when sampling lights. For example with a value of 100 per cent, each SSS sample uses lights with the number of samples specified in light quality settings.

09 Prepare the diffuse scattering If the single scattering is working fine, then it's time to move to the diffuse scattering. Just to remind you, diffuse scattering takes all lights into account when it comes to the light calculation. Under the hood, it's multiple scattering which approximates light bouncing under the surface with higher performance costs than single scattering. For this workshop, increase the environment light intensity to a value of 2 and afterwards set the diffuse scattering function to 100 per cent. These values will give us a realistic look and feel for the skin after the next setup.

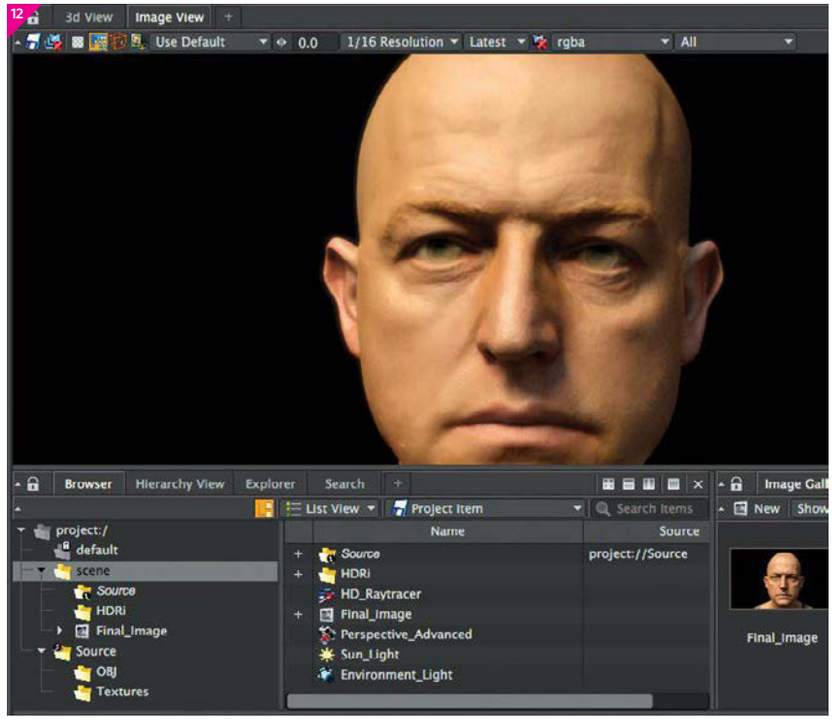
10 Surface tweaks for the SSS We are good to go with the scattering functions but we haven't yet touched one of the most important parameters for our given look – the SSS scale. This scale defines the thickness of the surface as it is where we can make a wax-like material or thin skin. With a scaled mesh of 100 per cent we can take a value of 5 decimeters as thickness. These values should give us a great look, especially around the ears and other parts of the head like the nose. The albedo can stay at the default value.

11 Adjust sampling quailty values Before we start the rendering process we must set up some parameters for the rendering. Let's select the HD_Raytracer object in the project browser. In the Attribute Editor, under the sampling area, the most important rendering features are quality and speed improvements. Set a proper number for the Anti Aliasing Samples, something around 8 – for good machines you can use a value of 12 or more. The Filter must be changed to Blackman-Harris and for Filter Size use 3x3 pixels. Blue Noise is actually the fastest sampling mode, so we'll keep it.

Faster render times with single SSS

In some cases it's better to avoid diffuse subsurface scattering and just go for single SSS by placing different area lights around your objects. This is like the good old days with fake GI when a couple of area lights did the job instead of taking the environment lights into account when computing the SSS.

12 Render the final image Now as all values are set and assets are in place we can go for a full image render. To render out an image in Clarisse we make use of the render view. To open the render view, simply open up a new window by pressing the plus symbol next to the 3D view and choosing Image View. Now take the image object in the scene browser and put it in the empty window space via drag and drop. Clarisse will automatically start the rendering process of the final image. To abort the process simply switch to another window or close the Image View.



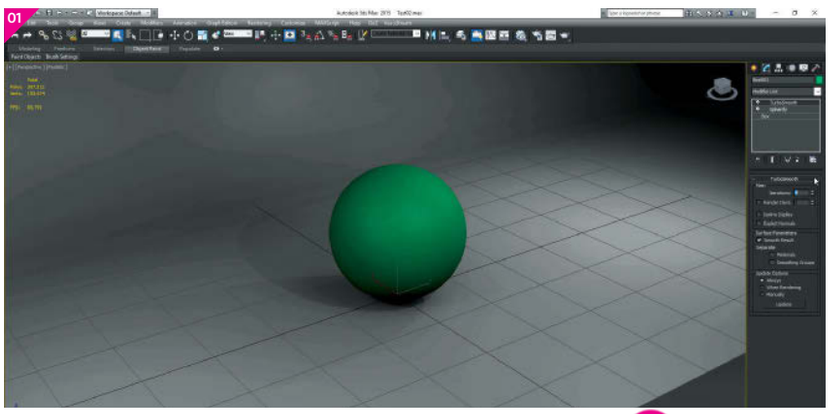
3DS MAX, ZBRUSH

Sculpt and detail realistic rocks

Through a simple process, you can learn how to achieve realistic rocky formations and improve the final shading as well as lighting in 3ds Max and ZBrush. We should mention that there are several ways in which you can create rocks. For example, you can start creating rock formations by sculpting the whole model in ZBrush, or as we did, by using modifiers such as Displace or Noise in 3ds Max – this enabled us to play with different parameters to reach cool and detailed models.

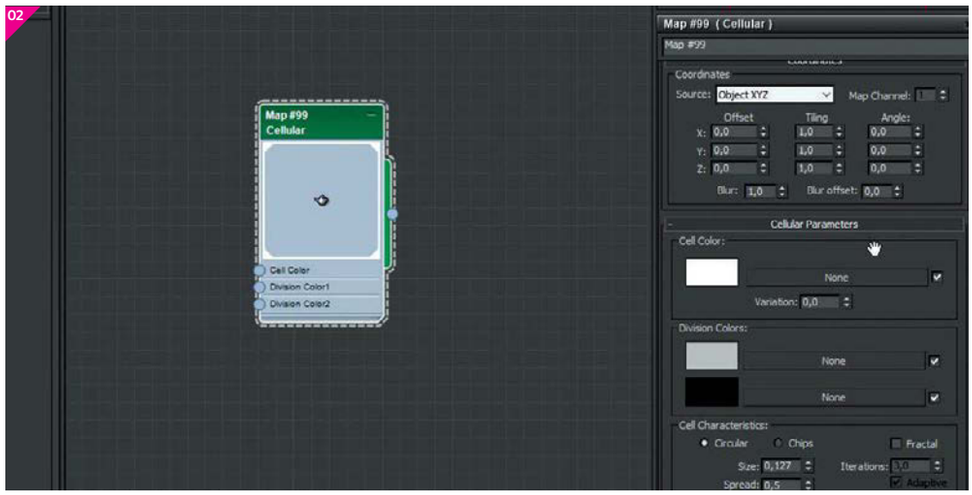
Let's focus on working on this tutorial for now though; the rocky formations can be created using a base mesh as a cube and with the help of 3ds Max's modifiers, you can test different parameters to get the look of a realistic rock. We should start off with the use of a low-poly base mesh. Then we will make use of modifiers like TurboSmooth so that you can increase the iterations, which enable us to control the subdivision level of the final mesh.

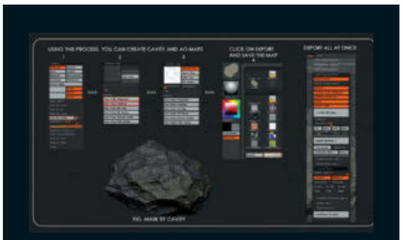
You can also turn your model into an asset for use in videogames: by using the well-known process of projecting we can project all of the details of the high-poly model to a low-poly model for use in real-time render engines. The low-poly model is a mesh of low sizes (megabytes), and so we can get all of the details of the high-poly mesh through the maps as normal or displacement.



A good tip would be to try to study some pictures of rocky formations and try to achieve the surface morphology of rocks. In CG work, it's best to avoid working aimlessly – it is really important to study references before, because it will save us a lot of time.

YOUR FREE DOWNLOADS
from **filesilo.co.uk/3dartist**
- Tutorial screenshots
- Video tutorial





Create the maps

The process of creating maps is really simple. Take a look at the image above. Following the steps of the current process you can also export the Diffuse map. For the Diffuse map (once you have painted it all) go to Texture Map and click on 'New from polypaint'. For Displacement and Normal maps, you can see their respective tabs for creating them, and once you have created these maps, clone and save them. Another way to export all the maps at once is by going to ZPlugin>Multi Map exporter. Tip: if you have some problems with UV maps, check the Flip V.

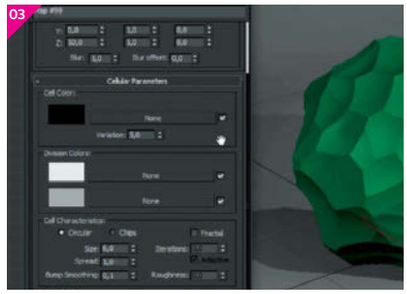
01 Base mesh object In the first step we will be making use of 3ds Max. Go to Create>Standard Primitives and click on Box. In Parameters set the three first values to 20 (length) and the segments to 10. Now go to the Modify tab and add the Spherify modifier. Then add the TurboSmooth modifier and change the iterations to 5.

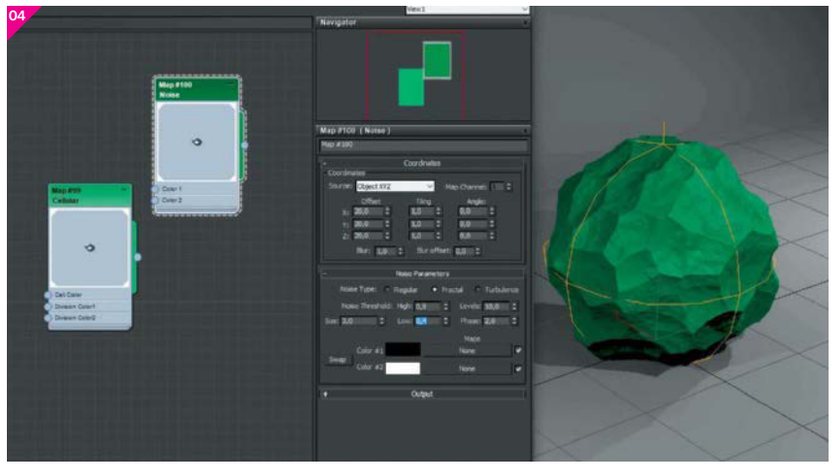
02 Add Displace modifier The Displace modifier is great for controlling the rock details that are added to the base mesh. Go to Modify and add the Displace modifier. In Displacement parameters, set the Strength to 3 and the Map to Spherical. Click on the Map tab and add a material as Cellular. Now open the Slate material editor, then drag and drop the previous material map added to the map slot in Displace modifier, and change the map parameters using the material editor. In the coordinates of the material, take a look at Offset and change the x and z values to 1.

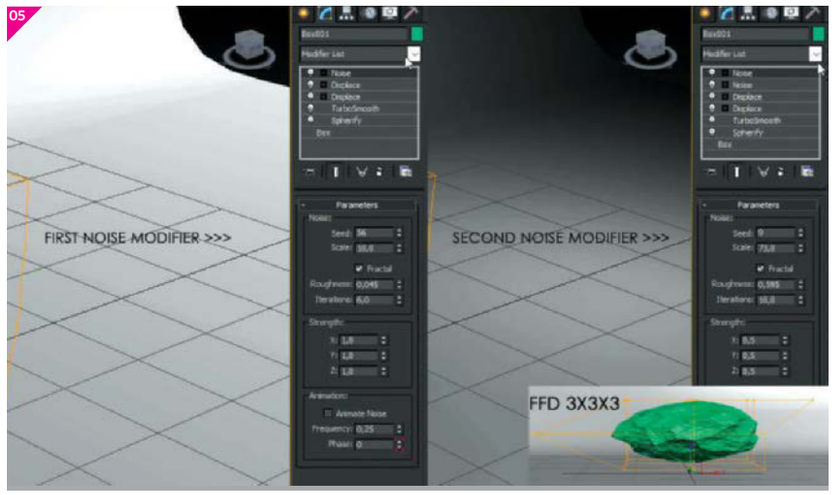
03 Displace modifier settings Continuing with the previous step, set the cell colour to pure black using a variation of 5. Then change the division colours to 180 and 107. In cell characteristics, select Circular and set the Size as 6, Spread as 1, and Bump Smoothing as 0.1. For the other parameters, keep the default values. In thresholds, set Low to 0.0, Mid as 0.4 and High as 1.

04 Second Displace modifier Following the previous process, add another Displace modifier, but in this case we should set Strength as 0.5 and in the map slot add Noise as a standard map. Then drag and drop the material to the editor, and change the values of the noise material. Offset x and z as 20. Then, in Noise Parameters, set Noise type as Fractal. In Noise Threshold set High as 0.9, Levels as 10, Size as 3, Low as 0.4 and Phase as 2.

05 Add Noise modifiers Now following the previous steps, instead of adding a Displace modifier, we should add a Noise modifier using the parameters of the current image under the title 'First noise modifier', and once you set these values, add another Noise modifier using the values under the title of 'Second noise modifier'. The Noise modifiers enable you to add details to the surface that's trying to duplicate the original morphology of the rock. Once you've done this, add another modifier as FFD 3x3x3, open the options and click on Control Points. This will let you adjust the size of the rock.





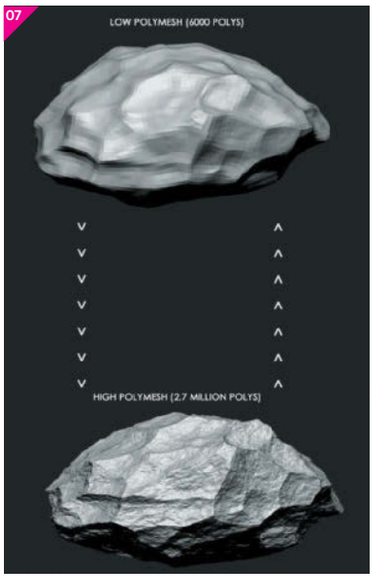


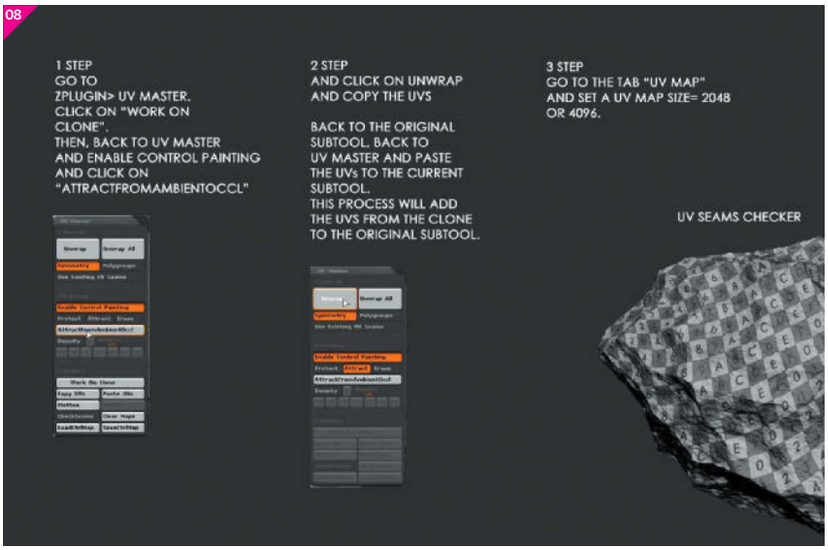
06 Export the mesh to ZBrush In 3ds Max, select the mesh and click on the GoZ tab (you can install this option when you install ZBrush) and this will open your mesh in ZBrush. Once the mesh is opened in ZBrush, add a new subdivision level by going to Geometry>Divide. Then, go to the SubTool tab and click on Duplicate. This will duplicate our current mesh, so we can create a low polymesh from the high polymesh. With the first mesh that you selected opened, go to the Geometry tab and click on ZRemesher using the values of the current image.

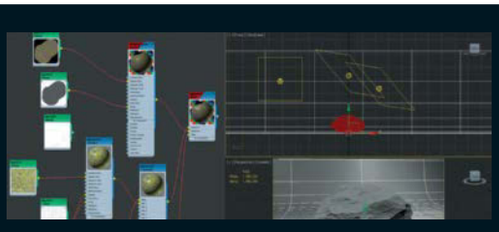
07 Project the high-poly mesh details Once we have the low-poly mesh, go to Subtool>Project All (you can change the PA Blur to 0 at this point). Then, go to Geometry>Divide, go back to Project All, then Divide again. Repeat this process until the polycount of the geometry can reach the high polycount level of the high-poly mesh. This process will add multiple subvision levels to the current mesh, enabling us to work correctly in the next step of UV maps.

08 Create UV Maps You can see in this step's image that there is a detailed description of the creation of UVs. For this step we used 'Attract from Ambient Occlusion', but you can use the option of Attract and paint the areas of the UV seams. Then copy the new UVs, go back to the original SubTool and paste the new UVs created from UV Master. This process updates the subdivision of the current mesh. A good tip is to add a texture as the UV checker by going to the Texture Map tab, adding a UV checker map and clicking Texture on.

09 Texture the mesh Go to the Polypaint tab and enable it. Select a basic material and activate the Mrgb option (uncheck Zadd-Zsub). Go to the top tab of Color and click on Fill Object. Then, go to the Texture windows and import a new rock texture to be painted over the mesh surface. In this case we used free textures from textures.com. The tools we used to paint with were the Standard brush and Strokes: DragRect. Once you've painted it all, go to Texture Map>New from Polypaint. Click on Clone, and save the map by exporting it from the Texture windows (on the left side).

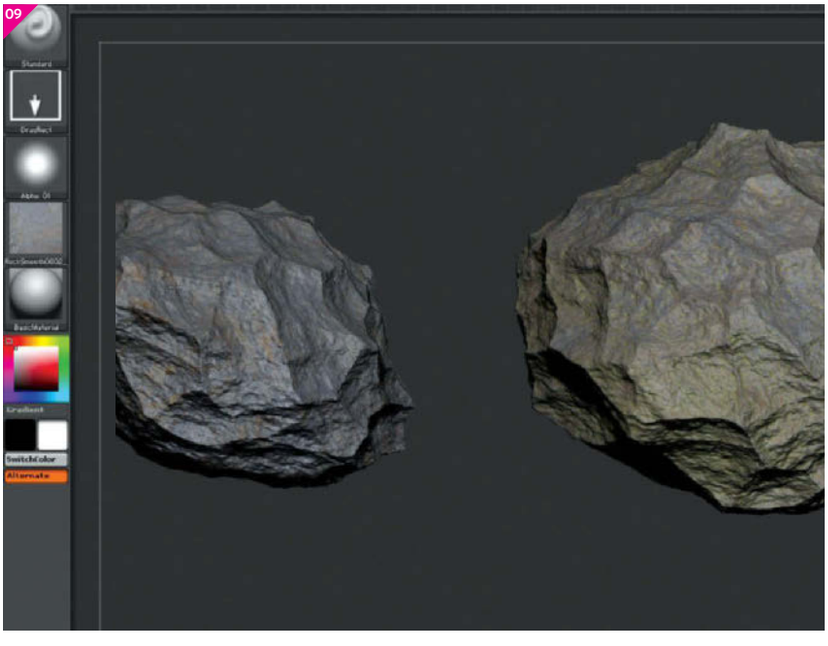



08
1 STEP
GO TO
ZPLUGIN> UV MASTER.
CLICK ON "WORK ON CLONE".
THEN, BACK TO UV MASTER
AND ENABLE CONTROL PAINTING
AND CLICK ON
"ATTRACTFROMAMBIENTOCCL"
2 STEP
AND CLICK ON UNWRAP
AND COPY THE UVS
BACK TO THE ORIGINAL SUBTOOL, BACK TO UV MASTER AND PASTE THE UVs TO THE CURRENT SUBTOOL.
THIS PROCESS WILL ADD THE UVS FROM THE CLONE TO THE ORIGINAL SUBTOOL.
3 STEP
GO TO THE TAB "UV MAP"
AND SET A UV MAP SIZE= 2048
OR 4096.
UV SEAMS CHECKER



Final render setup

The final render image was done in 3ds Max and mental ray. In the attached image you can see some material compositions. I mixed the original standard material with the others using Blend Mat to add small details as noise, using green textures through the Composite Mat. The lighting was done using Photometric lights. The low-poly model that you have created during this tutorial can be used in Marmoset Toolbag, Unreal Engine or CryEngine. Tip: Try to play with different parameters to get realistic lighting. Export the final render in .EXR (32bits) and adjust the curves in Photoshop.



Special offer for readers in **North America**

5 issues FREE

When you subscribe*

FREE resource downloads every issue

4GB OF FREE ASSETS VIDEOS, MODELS & MORE
3DArtist
91
www.3DArtistonline.com
Practical inspiration for the 3D community
INSTANTLY UPGRADE YOUR
MAYA SKILLS
40 EXPERT TIPS PAGE 22
Improve today with pro insight
Master the entire 3D pipeline
Streamline your workflow
CLARISSE EXPLORED
Get to grips with the powerful 3D tool used on Star Wars
+
Lighting techniques
ZBrush sculpting
Redshift verdict
Quixel textures
WIN AN OSCAR
Plan, design and direct your own award winning animated short at home
BUILD A PRO LEVEL PC FOR ONLY £2,000

"Practical inspiration for 3D enthusiasts and professionals"

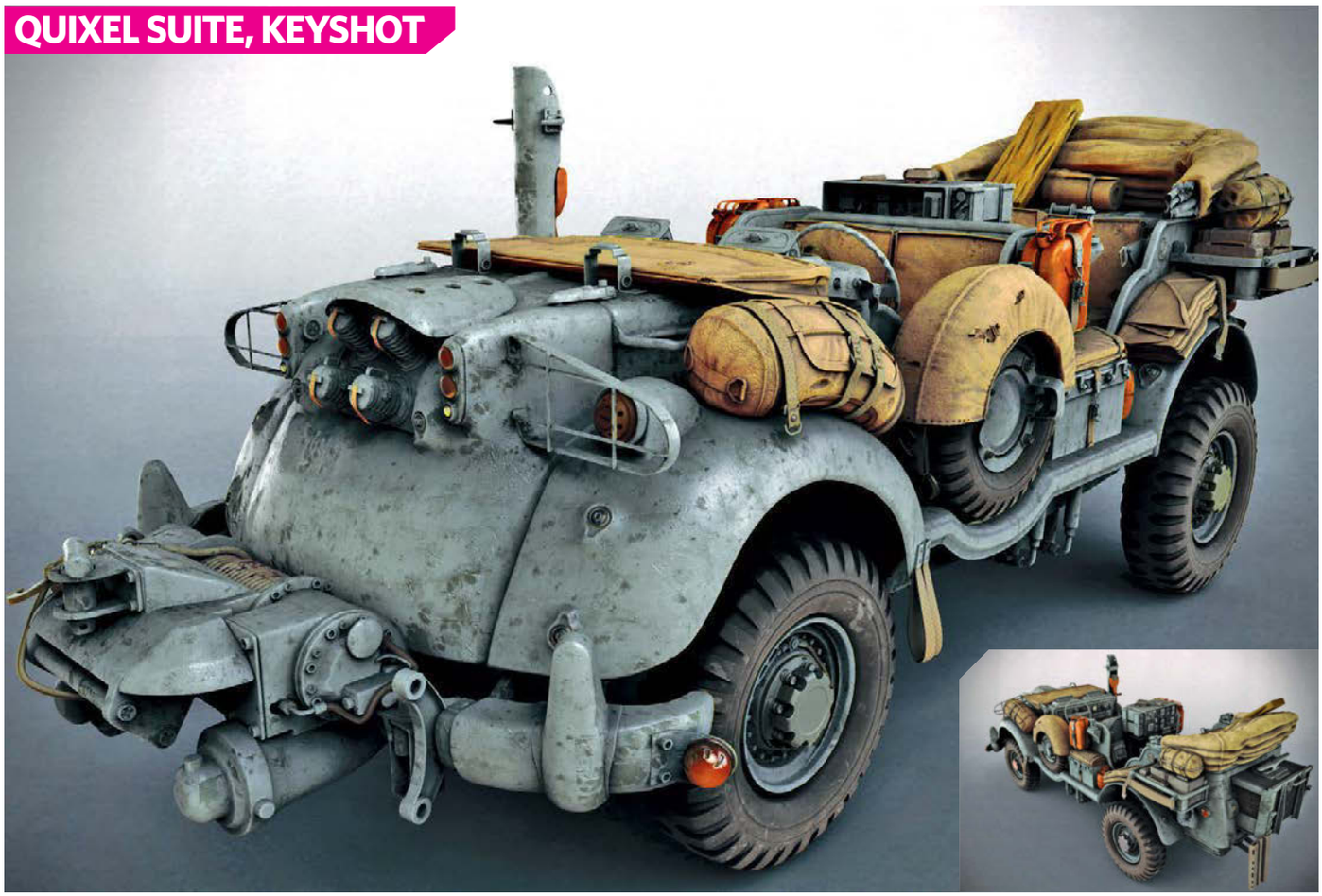
Order hotline **+44 (0) 1795 592 951**

Online at **www.imaginesubs.co.uk/3da**

Quote **USA2** for this exclusive offer!

***Terms and conditions** This is a US subscription offer. You will actually be charged £80 sterling for an annual subscription. This is equivalent to $120 at the time of writing, exchange rate may vary. 5 free issues refers to the USA newsstand price of $14.99 for 13 issues being $194.87, compared with $120 for a subscription. Your subscription starts from the next available issue and will run for 13 issues. This offer expires 31 May 2016.

QUIXEL SUITE, KEYSHOT



Texture a wartime jeep

The method that we will be going over in this tutorial is excellent if you want to present your model in a clean and interesting way for your portfolio. We will go over all the necessary steps of texturing a high-poly model with procedural textures using this method. We will take a finished high-poly model from my sci-fi vehicle series and texture it in the same style as my other vehicles. This tutorial is aimed at beginners, but it can't hurt to have some basic understanding of Quixel SUITE and KeyShot – they should be really easy to understand anyway. The methods that we will cover are super useful if you want to texture your model in a quick and non-destructive way. For this we will make a couple of tileable textures; we will make sure that they fit with each other so that they can be blended into each other to get an even more unique end result. This tutorial also comes with an extra video where we will apply the same method on a complete different model – that way you can see that the method we have chosen is very flexible. In this video we will make a new texture from scratch and also use some old textures to blend it with. This project also comes with a pack of tileable textures and some alpha maps too so you can practise working on your own if you want to. For people who want to look at and learn other methods to achieve the same result, make sure you check out Tor Frick's tutorial of his sci-fi transport vehicle on YouTube.

01 Materials setup While modelling and designing it's really useful if you set up materials, that way it's easier to understand your model and check if your upcoming textures are too noisy. You never want to have too many colours/materials in the same model. Your eye needs some rest to take in details instead of new materials every metre. For example: make sure you don't have more than a maximum of two to three metals in your model. So set up some easy materials – this is also really important for later when you import your model in KeyShot – and export it using the BIP extension for KeyShot.

YOUR FREE DOWNLOADS
from **filesilo.co.uk/3dartist**

- Tutorial screenshots
- Textures
- Video tutorials

02 Start with Quixel For getting a nice quick base you can use Quixel SUITE as it has a lot of layers that you can work with. We only need a Normal map and a mask to get started. The mask can just be one blank colour, most of the information should come out of the Normal map. Just like all texture programs, Quixel bases its mask information on the Normal map information – for example scratches on the edges, dirt in the cavities. So just plug those in. Go for a material preset you like, and check out the outcome.

03 Make layers and share normals Now that we have a base we just want to make sure that we don't have everything noisy. Save all the dirt, scratch, rust and/or paint layers separately so that you can blend them into each other later. Just make a mask now and save them as a PNG. Try different materials out. It's a good idea to sometimes use the same Normal map while making these textures, so that all the damage and dirt are located around the same area – you don't want to have them scattered around the whole vehicle (if you do this you can still cancel out unrealistic areas by using an inverted ambient occlusion).

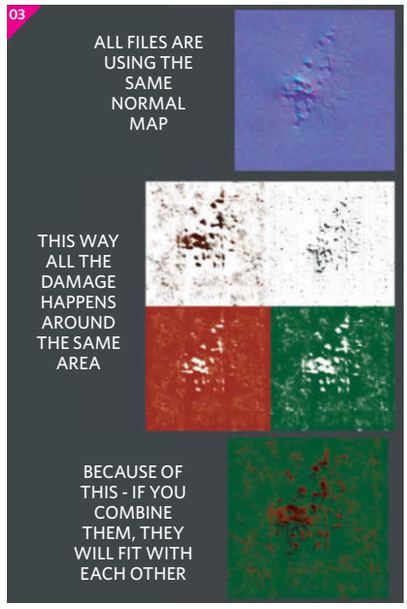
04 Combine textures with alphas You want to have your textures exported as PNG files – the great thing about PNG files is that it remembers what was blank or was not used. See it as painting decals on your vehicles. So how can you do this with a normal texture from the internet? Easy, you could just erase some of the texture information with a brush, but that is a really destructive way of working. A better way to do this is to make an alpha mask and to then link it to the image – that way you can still change it. Or even better, you could make different iterations of the same texture as that will mean that your vehicle is less noisy.

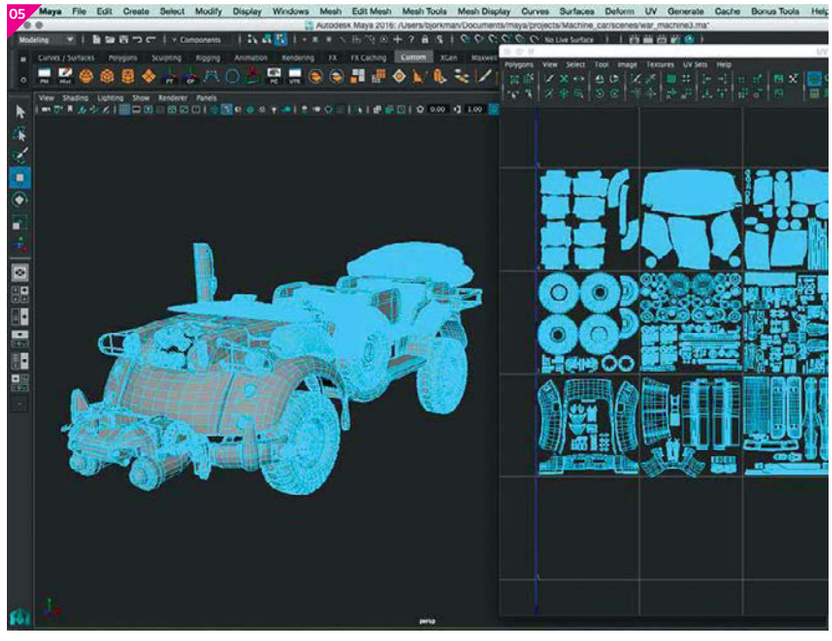
05 Project box mapping Unwrapping high polys can be super annoying and can take a really long time, especially if the model has a lot of details. If you unwrap it the traditional way then you have to do it as a 3D model package, straighten everything out and pack it really nicely – a really great example of this is in Rory Björkman's work. But we can do this in a procedural way too – for this we will move to KeyShot. You can unwrap your model in different ways: Planar, Box, Cylinder, spherical and cylindrical, for example. We want to go for box unwrapping; it's not perfect but with a tileable texture it should fix a lot of problems.

Search for your own style

Don't always use the same Alpha maps or textures that you can find on the internet because sometimes it's really easy to spot. Try to combine internet resources with your own textures or alphas. For this you only need to make a custom brush. Just don't be scared to experiment – you can only learn from your mistakes. Small tip: it's also worth checking out Substance Painter and Substance Designer for unique textures.

> "Save all the dirt, scratch, rust and/or paint layers separately so that you can blend them later"


03
ALL FILES ARE USING THE SAME NORMAL MAP
THIS WAY ALL THE DAMAGE HAPPENS AROUND THE SAME AREA
BECAUSE OF THIS - IF YOU COMBINE THEM, THEY WILL FIT WITH EACH OTHER

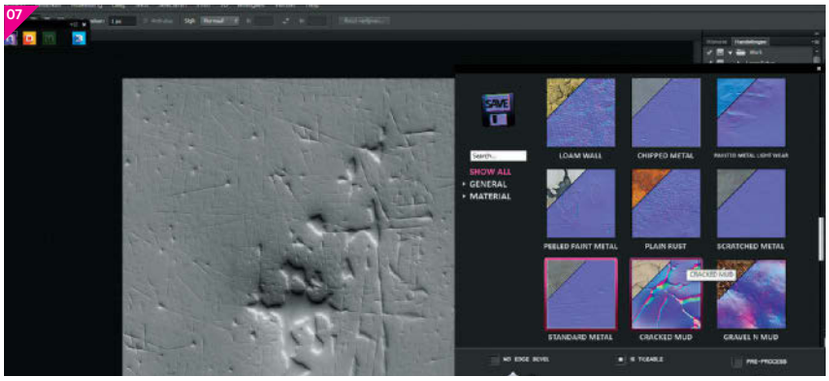


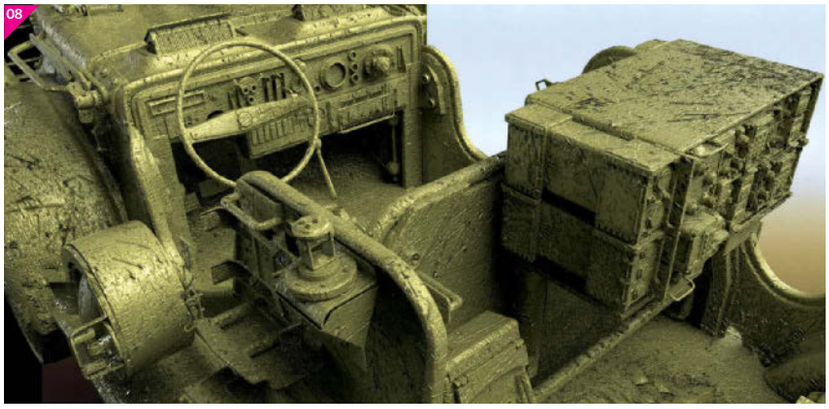
06 Texture blending Making one tileable texture is nice, but combining them is really interesting. Just think about real materials; everything is built out of layers. For example: the first layer is a bare metal, then a base coat, a paint primer, dried-up dirt and then fresh mud. You want to bring this to your model, but don't do it the same, just think logically – you don't want to have scratches or metal flakes covering your dirt patches. Another thing we can do is duplicate a material multiple times, rotate them separately and blend them with the intensity and contrast slider.

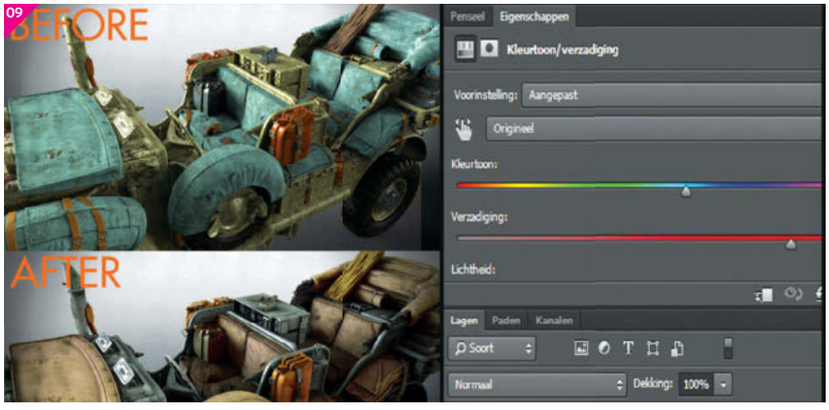
07 Bumping materials Adding bump information to your model can add a lot. First of all it helps you in defining your materials even better. Just imagine a coloured sheet – some people would not understand what it is but by adding a stitch pattern or seams, it's really easy to understand. Next to that it can help give more lighting information in the cracks and on bumps. We can also make Bump maps by using NDO from Quixel. Convert your image to a Normal map or a Bump map. Make sure that this is also a tileable texture, and don't make it too noisy.

08 Experiment with values and sliders We now have our model finished, but of course nothing holds us back in experimenting with texture depth. The scale slider lets you change the size of the texture – you just want to be sure people don't notice the pattern, so don't set it too high. Same for the bump height, these things should be sudden so don't overdo this. Make sure that these two values work together nicely, it will help to make it all look realistic. If you used a Normal map in the last step, don't forget to check if you have enabled the Normal tab at the bottom of the bump texture options.

09 Make tweaks in Photoshop It's never a bad idea to put enough contrast in your materials. That way if you don't like the colour scheme at the end result you can still change it when you get to the end. You just have to use masks and adjustment colours – this method can be really useful if you want to change the overall look of you vehicle. You can take this even further by using level adjustments to make the 'old' colours darker or lighter. As you can see in the image it can change a lot. It's a bit of cheating but as long as it benefits the end result that should not matter.







Post-production is key

One of the biggest mistakes you'll see is that some people just skip the post-production step. And this should never happen, you should do everything you can to make your render as beautiful as it is. Post-production doesn't mean make your render more noisy – it's the opposite. It could be blend or change your colours more, add particles, add spec and shadow information. You can even remove backfaced shadows caused by floaters. It always comes back to cleaning up and selling your image at the highest quality that it can be.

If Apple made a magazine

www.icreatemagazine.com

Mac iPad iPhone Watch
iCreate
2GB OF FREE DOWNLOADS
10 TIPS TO STAY ORGANISED
GET MORE FROM iCLOUD
50
CRITICAL iCLOUD TRICKS & FIXES
Master Mail, Calendar & Contacts
Never use Dropbox again
Unlock more free storage
Halve the size of backups
SET UP PARENTAL CONTROLS FOR TV
LEARN TO PLAY THE GUITAR
iMOVIE EDITING MASTERCLASS
Turn your footage into an Oscar worthy Hollywood blockbuster
EDIT WITH SNAPHEAL
25 ESSENTIAL TV APPS
14 PAGE SPECIAL GENIUS BAR EDITION
CALIBRATE YOUR MAC DISPLAY
DROPBOX MASTERCLASS
AMAZING APPS FOR iPHONE 6s
NEW iMACS WITH RETINA DISPLAY
WIN GOPRO HERO WORTH £109.99
THE END OF THE MACBOOK?
TOP 10 EL CAPITAN SECRETS
SUPERCHARGE PHOTOS
GET MORE FROM iOS 9
MASTER OS X EL CAPITAN
32 EXCITING REASONS WHY YOU NEED TO UPDATE TODAY

EVERY ISSUE • FREE RESOURCE DOWNLOADS

iCreate™

Available from all good newsagents & supermarkets

ON SALE NOW

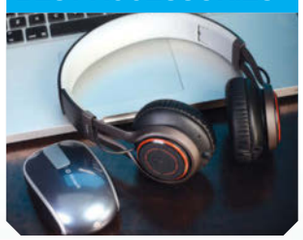
• iCloud tricks & fixes • iMovie editing masterclass • New iPhone

TIPS & TRICKS

HARDWARE REVIEWS

CREATIVE PROJECTS

BEST ACCESSORIES



iOS & OS X APPS

BUY YOUR ISSUE TODAY

Print edition available at www.imagineshop.co.uk

Digital edition available at www.greatdigitalmags.com

Available on the following platforms

Print Tablet Phone Desktop

facebook.com/icreatemagazine twitter.com/icreatemagazine

YOUR FREE DOWNLOADS
from **filesilo.co.uk/3dartist**
• Tutorial screenshots

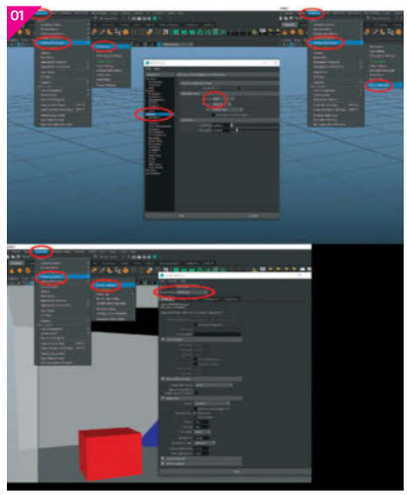
MAYA, MENTAL RAY

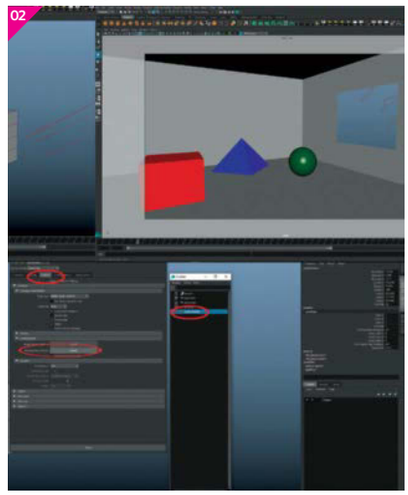
Light arch-vis interiors and exteriors with mental ray

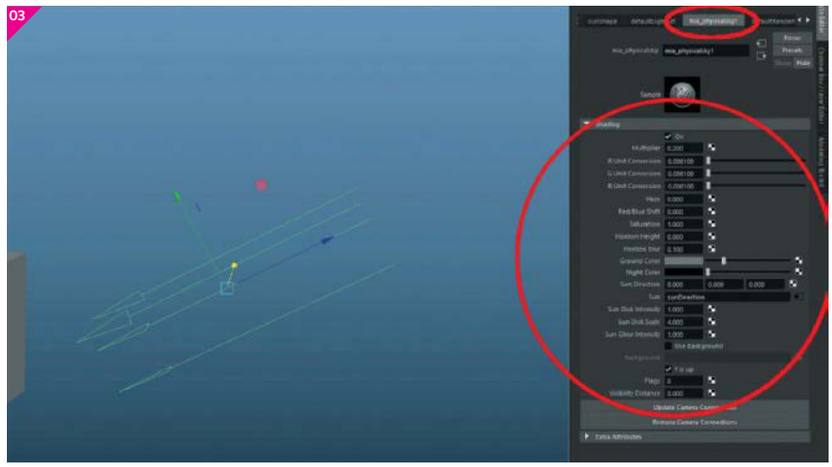
Many 3D artists like to bring renders to the top level. That is why we are divulging a unique technique that innovates the rendering of both exterior and interior arch-vis lighting. It utilises amazing tools in Maya such as Physical Sun and Sky, mental ray Materials, Mia Exposure Photographic Lens, Linear Color Management and Portal Lights. This tutorial will work with Maya's mental ray only. Understanding some of the technical side of mental ray is key to your success in this guide. Mental ray is a powerful render system used to add realism into your scenes. Physical Sun and Sky is a great tool that, with some adjustments to the camera, will enable you to create realistic sunlight in a short amount of time. Mia Exposure Photographic is a lens node for your camera that gives you more control on the render, it's kind of like having exposure, film ISO, f-stop number and so on – essentially it is as if you have all the settings that you would get on a real camera, only inside of Maya and mental ray. Linear Color Management is a great tool for achieving accurate colours from the textures and shaders that you are using in your scene, and in Maya 2016 they have improved drastically and are easier to use. Portal Lights are a huge help on your renders. We all know that 'regular' Area Lights are great at creating realistic light bounce on objects and soft shadows, but if you add a Mia Portal Light to the Area Light then you will achieve some impressive results. We will also go over how to set up Physical Sun and Sky, Mia Exposure Photographic Lens, Linear Color Management and Portal Lights using a simple scene. After absorbing this tutorial you will have a better understanding of rendering architectural scenes with mental ray.

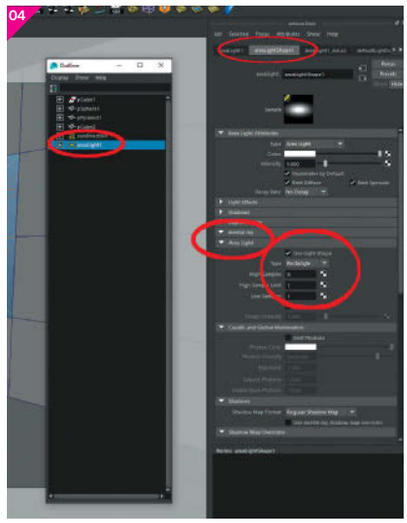
01 **Set up the scene** In Maya, create a new scene with File>New Scene, just to make sure we start with a clean setup. For better accuracy let's work with metres by going to Windows>Settings/Preferences>Preferences>Settings>Working Units>Meters. Let's create a room with a window. For that just make a simple rectangle box with a hole and you can create simple objects inside the room to see how the light interacts. Turn on mental ray with Windows>Settings/Preferences>Plug in Manager>Mayatomr.mll. Now change the settings to render mental ray by going to Windows>Render Editors>Render Settings>Render Using>mental ray.

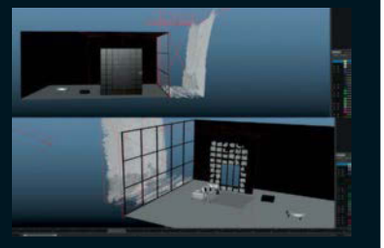
02 **Physical Sun and Sky** Now we can set up our sunlight by adding Physical Sun and Sky. We can do this by going to the render settings in the scene tab, then over to environment and hitting Create on Physical Sun and Sky. This will create a directional light that will represent the Sun. You can rotate the light to adjust the direction of the sunlight. Keep in mind that when working with metres new lights tend to be small so do ensure that you check your outliner. For this tutorial we will rotate the directional light that is pointing at an angle with the window of our room.


01


02


03


04



Portal Area Lights in action
Here is an example of a scene. You can see where we placed multiple Portal Area Lights with Physical Sun and Sky in order to create the realistic lighting in the library scene.

03 Physical Sun and Sky settings In the Attributes Editor of the light we just created a tab named mia_Physicalsky1. These will be the attributes of your Sun. We will make some changes to these. You can always refer to Maya's help guide if you want to explore more of these attributes in depth. The Multiplier attribute, for example, can be used to increase the Sun's intensity, whereas Haze can help you simulate what a cloudy day would look like. We will be adding a Mia Exposure Photographic node in our camera and that will add some new attributes.

04 Portal Lights Let's make a test render to see how the Physical Sun is acting in our room. Set up a camera inside the room in order to see the window and some of the objects. As you can see, our render is pretty dark. In the Area Light Attributes go to arealightShape>Area Light and turn on Use Light Shape. Here is where the magic happens. Go to the Area Light attributes under the tab Custom Shaders>Light Shader (checker box) and that will open a window in the search section. Type 'portal' and click on the mia_portal_light – this will add to the Area Light and create new attributes.

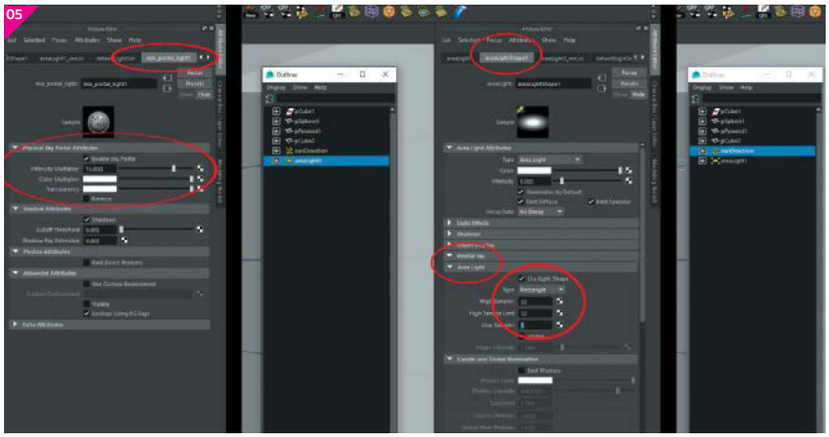
05 Adjust Portal Lights Now that we have a Portal Light shader in our Area Light, let's make some adjustments. In our Area Light attributes we have a new tab named mia_portal_light. In this attribute we can increase the Intensity Multiplier and add colour to the light. Let's set the Intensity Multiplier to 15. Render and you will see that it looks brighter and that the portal shader takes some information from the physical sun and sky lighting. To increase the quality, simply adjust the attributes on the Area Light shape. You can adjust the quality of the shadows in the areaLightShape attributes.

06 Colour management Now let's talk about Color Management. We can use Maya's colour management function to improve the accuracy on the RGB colours of our textures and materials. In Maya 2016 this feature is very powerful. Go to Preferences>Color Management> Enable Color Management to use it. The moment you turn it on, Maya will look brighter even in the viewport. Now do a render. We can see that the image is brighter and we can see more colour range on objects.

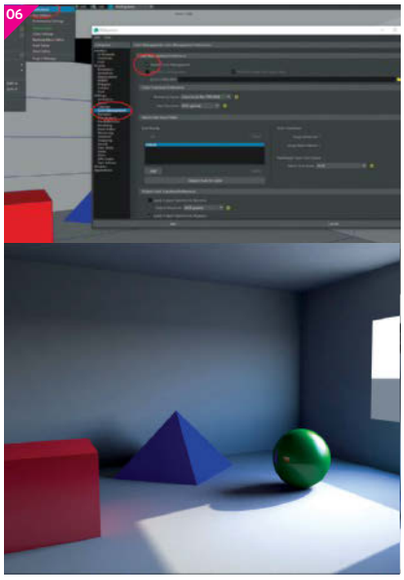
07 Mia Exposure Photographic Using Mia Exposure Photographic Lens is a great add-on for our renders. On a real camera there are attributes we can use to bring more colour or exposure to our photographs. We can create those attributes by adding a lens shader to our camera. Select your camera, go to the shape's attributes, and then scroll down until you see the mental ray tab. Click on the Lens Shader checker box. In the window, type 'photographic' and click on mia_exposure_photographic.

08 Mia Exposure Photographic lens attributes Now we have to make some adjustments in the Physical Sun and Sky. Select the sunlight and go to the mia_physical tab and change the RGB colours value from 0.0001 to 0.318 – that number is very important. Once changed, we can go to our camera's new attributes under the tab mia_exposure_photographic. Now here we have new amazing attributes. In this example we adjusted the Cm 2 Factor, F Number, Vignetting, Burn Highlights, Crush Blacks and Saturation and you can see how well the colours stand out now.

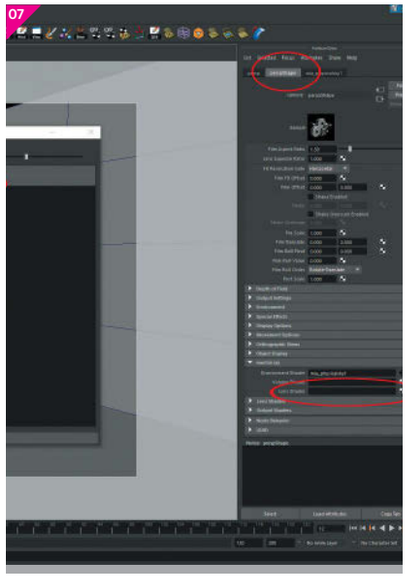
05



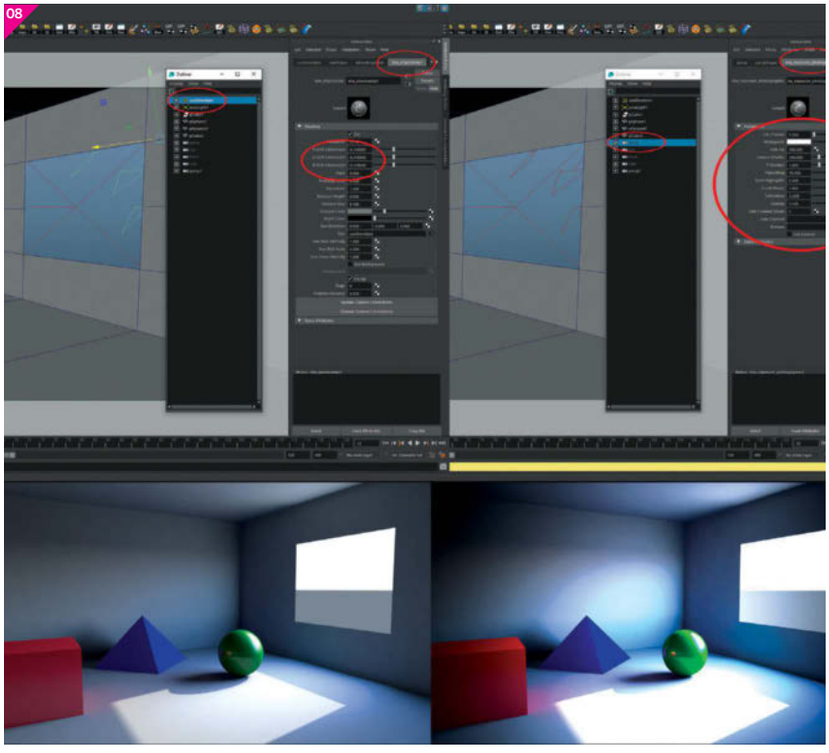
06



07



08



Technique focus

Incredible 3D artists take us behind their artwork

HAIR One of the biggest challenges in the mouse's fur was to keep its real-life characteristics while applying cartoon elements. To help the flow creation I have used splines and with all of them under the model, I orientated the hair to follow it. All attention should then be thrown back to the shader, paying attention to opacity of the strands and the speculars.

Milton Dias
miltondias.com.br
Milton is currently working for both national and international advertising agencies

Software ZBrush, 3ds Max, V-Ray and Photoshop

Special OPS, 2016

3DArtist ENJOY MORE OF YOUR FAVOURITE CGI

SUBSCRIBE & SAVE UP TO 37%*

6GB OF FREE ASSETS VIDEOS, MODELS & MORE
3DArtist
BLUR STUDIO EXCLUSIVE
4GB OF FREE ASSETS VIDEOS, MODELS & MORE
BLENDER TRICKS
INSTANTLY UPGRADE YOUR
MAYA SKILLS
40 EXPERT TIPS
BUILD A PRO LEVEL PC FOR ONLY £2,000
WIN AN OSCAR
EXPLORE MAYA
60 MINUTE CG FIXES
49 PRO RENDER TIPS
12GB OF FREE ASSETS VIDEOS, HDRIS, TEXTURES
ACHIEVE PIXAR QUALITY AT HOME
RENDERMAN

*US Subscribers save up to 40% off the single issue price.

See more at: www.greatdigitalmags.com

MAGAZINE FOR LESS WHEN YOU SUBSCRIBE!

Every issue packed with...

- Exclusively commissioned art
- Behind-the-scenes guides to images and fantastic artwork
- Interviews with inspirational artists
- Tips for studying 3D and getting work in the industry

Why you should subscribe...

- Save up to 37% off the single issue price
- Immediate delivery to your device
- Never miss an issue
- Available across a wide range of digital devices

Subscribe today and take advantage of this great offer!

Download to your device now

Redshift

With blazing speed, Redshift takes the lighting/shading process triumphantly to the creative side again

Finding a render engine that will deliver fast and amazing results has always been like the quest for finding the Holy Grail.

So therefore, it's understandable that we have been skeptical about GPU rendering. Other GPU render engines have been analysed under our magnifying glass before, but they were not fully integrated with the main DCC tool – some kind of bridge had to be crossed to reach the other side. Our team is always looking for new breathtaking products to improve our workflow, so it was great when we came across Redshift.

The process of installing Redshift for the first time and launching the DCC tool (Softimage in this case) was easy; it all fit like a glove. Quickly and without hesitation, we grabbed a cube, a sphere, a grid, a cone and chose Redshift as the render engine. Like we regularly do with any other render engine we are testing, we use a simple test, but one that definitively challenges the add-on in terms of compatibility with the out-of-the-box DCC. We stepped back, fired Redshift in the viewport and the grey geometry was there – almost instantly.

Without further ado, we opened the PPG of Redshift and stared at it for a moment to observe all of the options. We then started pushing the envelope, trying the different GI modes: Brute Force, Photon Map, Irradiance Point Cloud in every possible combination for the Primary and Secondary GI engines. In the blink of an eye, the image was there with global illumination filling every part of the scene. We then drove it further by adding more antialiasing samples, more lights and more textures too! We threw everything in our arsenal at it and Redshift took it all with ease.

Playing with the Redshift lights and materials made it seem like we had been working with those Redshift shaders since the very beginning. The quality of the final result achieved, with only little tweaking, was really stunning.

Trying to keep the shader parameters clear and with ease of use for the artist, but with enough complexity to drive the final result to the desired look, is not an easy task – but Redshift's main shader does it all with elegance. There is no need to dig into complex documentation to understand how the renderer works. Intuitively, you can build the kind of look you are after right away. The Redshift lights and shaders are designed to behave physically, so you can grab real-life material values and dial those straight into Redshift.

Regarding Redshift lights, the ability to plug in an HDRI into any Redshift light to illuminate your scene can deliver additional control for realistic indoor lighting.

Building complex shading trees is something that also feels like Redshift was born with in the core of the DCC. This is compatible with 99 per cent of the factory math, procedural, vector and colour nodes.

Working with deformation motion blur, depth of field, SSS, hair, bump/displacement and global illumination all at once is something that was once unthinkable. And yet, Redshift makes it all possible. Tweaking a scene for the final result with Redshift is now a really fun and creative process. Although it has a progressive rendering mode, the engine works incredibly fast.

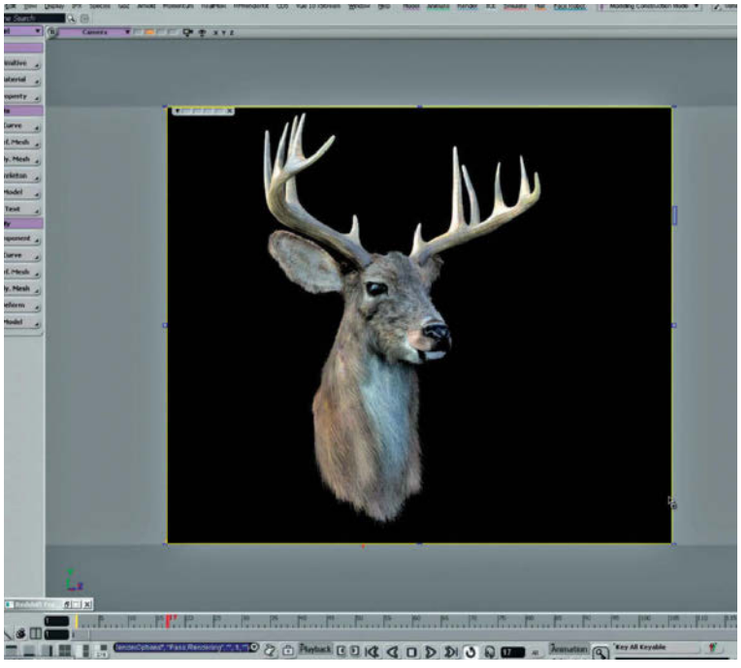
Compared to a 'traditional' CPU-based renderer, Redshift delivers 20 to 30 times faster. The time curve is reduced exponentially as you have more frames that will be waiting in line.

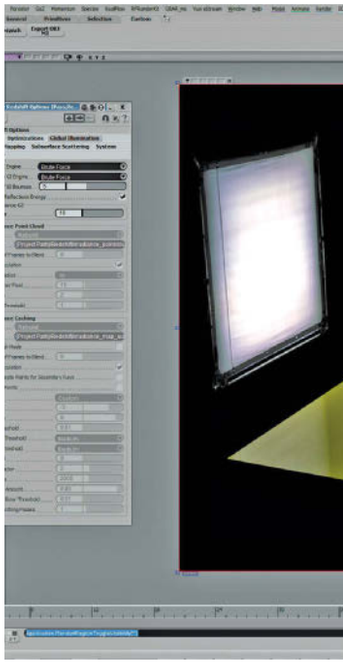
Redshift started out as a render engine only for Softimage and Maya. Now that it is also available for 3ds Max (in alpha), other DCCs will be just around the corner, so expect more updates from the Redshift team.

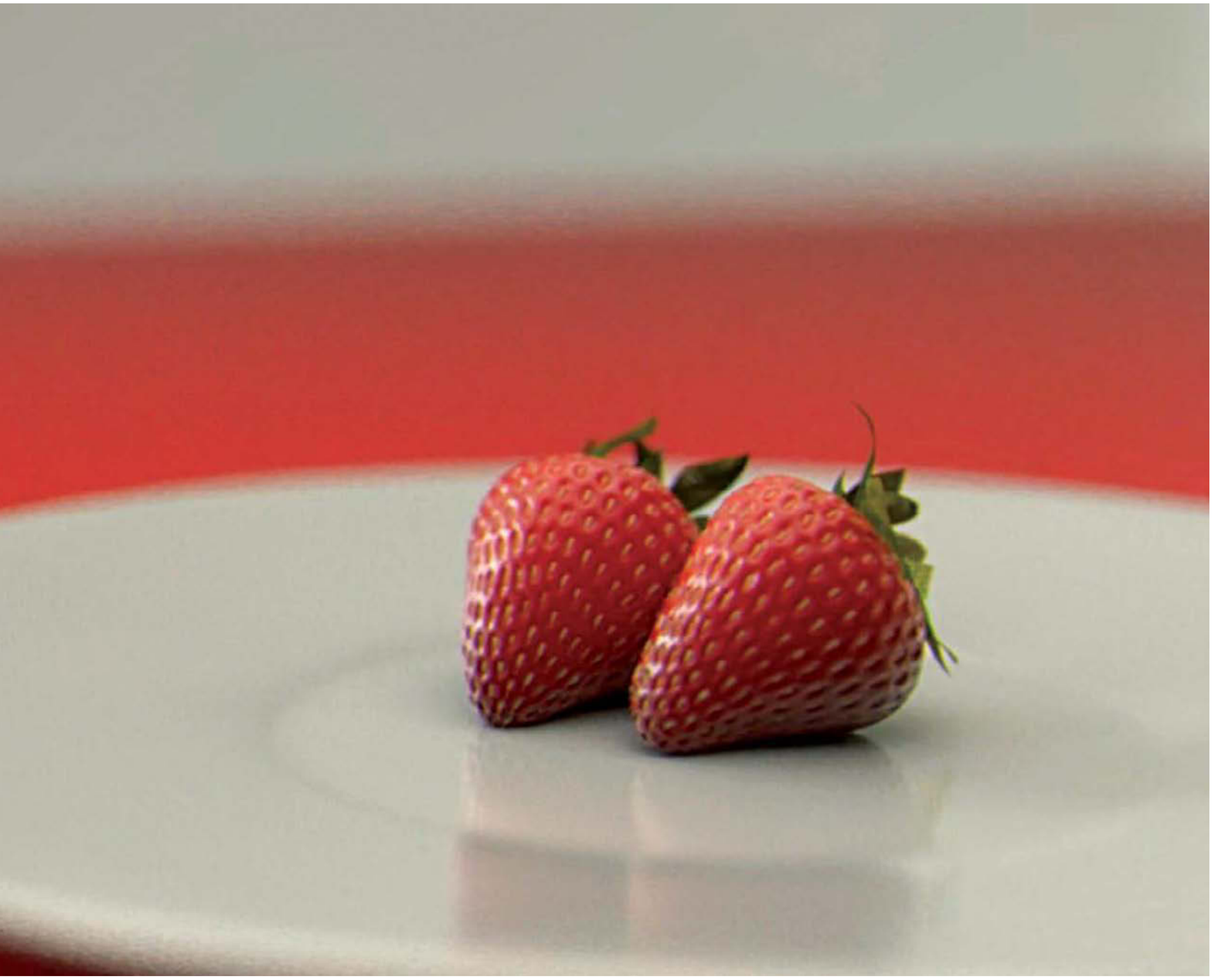
There is a new kid on the block, but it is so fast you won't be able to catch up with it. The only control you have on speed is when you hit render.

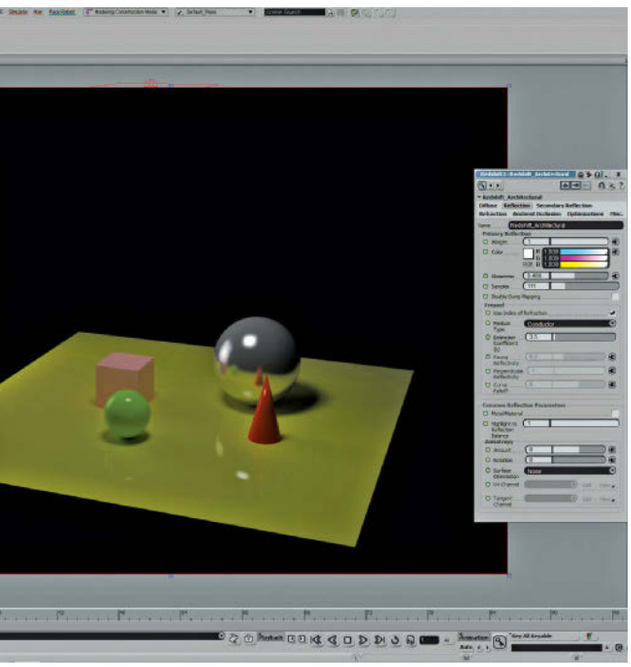
Emilio Hernández

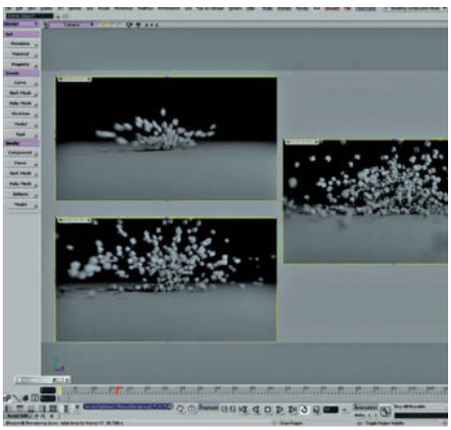
> "The ability to plug in an HDRI into any Redshift light to illuminate your scene can deliver additional control for realistic indoor lighting"











MAIN A Redshift SSS material with factory vector incident node attached to reflections and Brute Force GI

FAR LEFT Here, 800,000 hairs are rendered in only 40 seconds with Brute Force global illumination on in both engines

ABOVE Our fast moving particles test, with DMB and DOF enabled, rendered almost in real-time at 24fps in the viewport

LEFT Two Redshift lights are used: one of these lights has an HDRI with global illumination turned on

Essential info

Price	$500
Website	redshift3d.com
OS	Windows XP 64-bit and up / Linux 64-bit
DCC integration	Softimage, Maya
GPU	Nvidia with CUDA support
CUDA compute capability	2.0 and up
VRAM	1GB and up
Number of GPUs supported	8 Max

Summary

★★★★☆ **Features**
★★★★★ **Performance**
★★★★★ **Design**
★★★★★ **Value for money**

Verdict ★★★★★

Redshift is so fast and clean that it will blow your socks off. Oh, and it's noiseless too!

V-Ray 3.3 for 3ds Max

Chaos Group is known for releasing service packs packed with features, so we've put the third iteration of V-Ray 3 to the test

With every release, V-Ray for 3ds Max seems to get stronger and stronger. It's a great product anyway, but some might argue that this is largely down to improving hardware, and that would be largely incorrect. Chaos Group continuously improves what is going on under the hood to make its rendering engine bigger, better and more efficient with every release. This makes it a great investment for 3D artists of varying disciplines and no doubt many artists have already made the upgrade.

With any rendering software, users like two main things: rendering speed improvements and new features. The improved speed makes realism quicker to achieve and also enables artists to push the boundaries of what was previously impossible. The increased feature set does very much the same thing. Let's take a look at these two things in turn and we'll see how they apply in real project situations. In this iteration of V-Ray, Chaos Group is claiming that most scenes can render up to 20-50 per cent faster. These are impressive speed improvements and in our tests we found this to be nearer to the lower end but still very impressive. This is largely down to the new variance-based adaptive sampler (VBAS).

Ever since the introduction of 'Universal settings', Vlado Koylazov, Chaos Group's head of software development, has been keen to give users a rendering engine that produces good-looking images without tinkering, even if that isn't at optimal rendering speeds. Vlado's desire is written all over this service pack, as the sampler is far less dependent on the settings contained in materials and lights. Previously we would be constantly trading off the image sampling and the subdivisions of materials and lights. This has become less and less important as the image sampler focuses on reducing and evening out the noise. Whether you like this change or not, only you can be the judge.

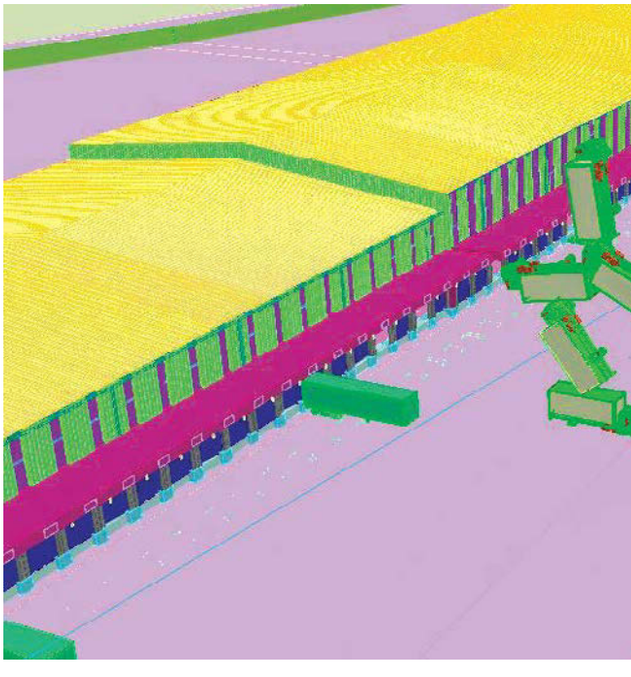
So what other new features have been introduced? There have been plenty! Let's begin by looking at the all-new sky model. The built-in sky models were pretty limited for a while, at least in terms of being able to use them as realistic back plates. On top of that, creating atmospheric depth has been a chore in the past, with the possible solutions being either too long-winded or unrealistic. The new Hosek sky model changes all of this and introduces an aerial perspective for efficient and realistic atmospheric depth. This is a game changer for external scenes.

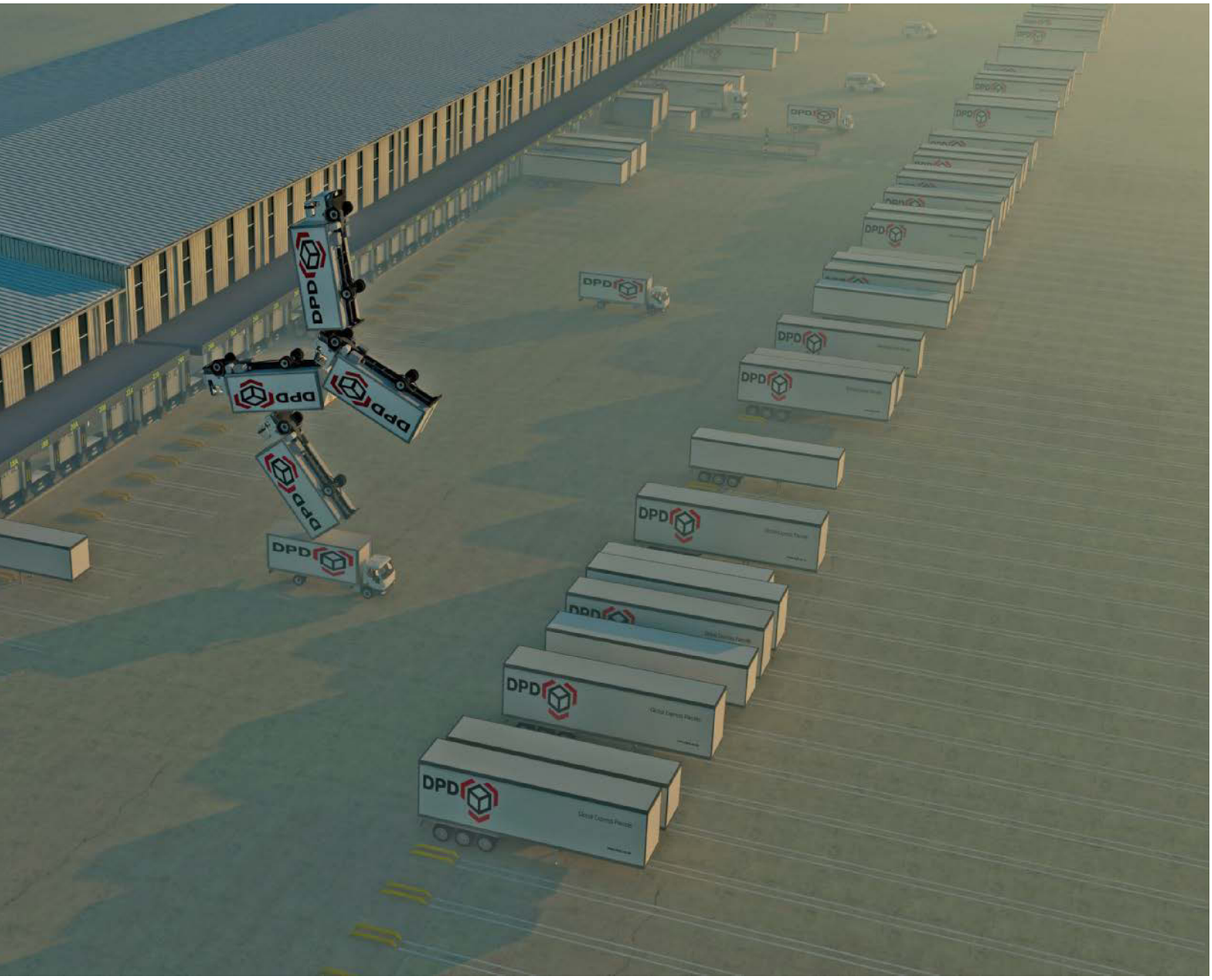
Now to the V-Ray Clipper. This was released at the start of version 3 and it was a brilliant and useful addition. However, it always lacked the flexibility to make more complex clips of geometry. That is all now a distant memory. You can use any custom mesh to act as a clipper for your geometry. V-Ray's example is a piece of cake which then has a bite taken out of it. This is a very practical example of how this feature can be used. We wonder, though, if it'll be more useful in creating 3D sections through models for arch-vis.

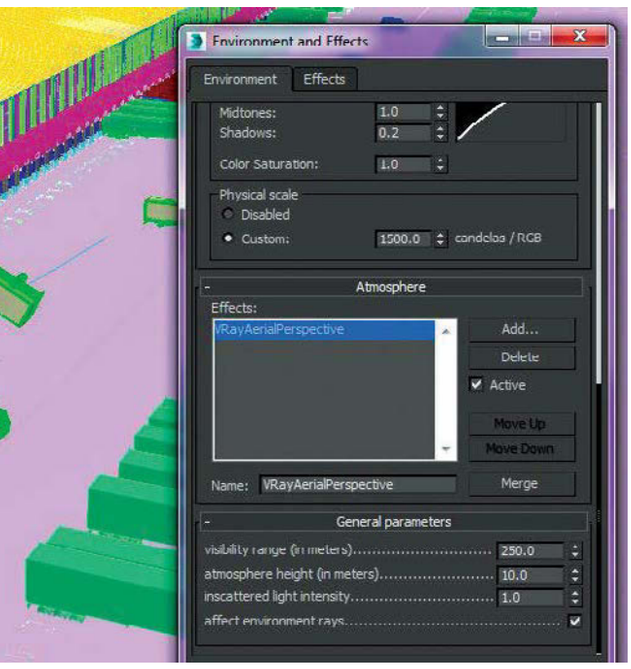
Let's briefly look at one more new feature before we wrap up. It's the ability to render ray-traced rounded corners. Every surface in reality has some sort of rounded edge, even if it's a small one. In the past artists would usually chamfer edges and be left with higher density meshes. This is now defunct as rounded corners are now the default.

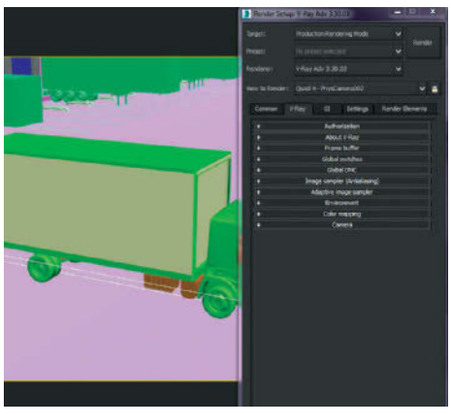
In summary, this is a solid release with plenty that will please artists. The fact that it's a free upgrade if you already have V-Ray 3 is great. You can also upgrade to version 3.3 from version 2 for only £260, which is also well worth the upgrade, especially if you consider all the features that have been introduced in version 3, 3.1 and 3.2. With all that Chaos Group has packed into this service pack, adopting it is an absolute no-brainer.

Paul Hatton









MAIN This large sortation centre is a perfect example of where the new aerial perspective tool comes in handy

FAR LEFT Clip any objects with the custom mesh mode. Make as complex a clip as you want and then texture the clip with a custom material too

LEFT The new aerial perspective lets you create beautiful atmospheric (fog/mist) effects quickly and easily

ABOVE The rendering setup interface will be familiar to all V-Ray users. It may be a bit complex for new users though

Essential info

Price £650 or free upgrade from V-Ray 3
Website chaosgroup.com
3ds Max 3ds Max 2011 64-bit versions and up
OS Microsoft Windows 8, Microsoft Windows 7, Microsoft Windows Vista, Microsoft Windows XP – all 64-bit versions only
RAM 4GB (8GB or higher recommended)
GPU Intel Pentium 4 (64-bit) or equivalent AMD 64 processor with SSE2 technology and up

Summary

★★★★☆ **Features**
★★★★☆ **Performance**
★★★☆☆ **Design**
★★★★☆ **Value for money**

Verdict ★★★★☆

An incredible release. It speeds up your workflow and introduces you to new, useful features

From the makers of 3DArtist

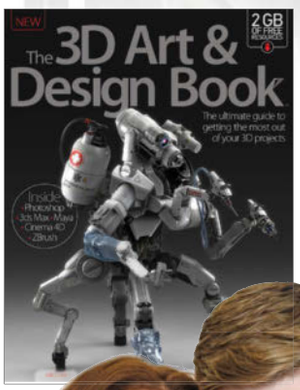
NEW
3ds Max ✔ Maya ✔ Blender ✔ ZBrush ✔ Photoshop
FREE 13GB OF MODELS, ASSETS AND MORE
3D Art & Design
Volume 2
Tips, Tricks & Fixes
Unlock the full potential of 3D design
152 pages of expert tutorials

3D Art & Design

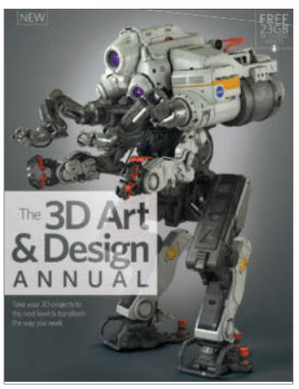
Tips, Tricks & Fixes

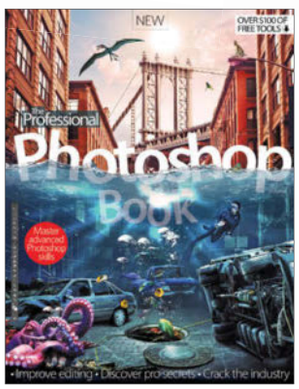
To take your design skills to the next level, you need to learn the tricks that make everything easier. 3D Art & Design Tips, Tricks & Fixes provides just that, so discover how to speed up your workflow and produce perfect art without a hitch.

Also available...


NEW
2 GB OF FREE RESOURCES
The 3D Art & Design Book
The ultimate guide to getting the most out of your 3D projects
Inside Photoshop · 3ds Max · Maya · Cinema 4D · ZBrush

NEW
An independent guide to Adobe Photoshop
200 MINUTES OF RESOURCES
Photoshop Tips, Tricks & Fixes
Suitable for all versions of Adobe Photoshop





A world of content at your fingertips

Whether you love gaming, history, animals, photography, Photoshop, sci-fi or anything in between, every magazine and bookazine from Imagine Publishing is packed with expert advice and fascinating facts.

BUY YOUR COPY TODAY

Print edition available at www.imagineshop.co.uk

Digital edition available at www.greatdigitalmags.com

Print · Tablet · Phone · Desktop

The Hub

The inside guide to industry news, VFX studios, expert opinions and the 3D community

> "Our goal is to help young creatives launch their careers in traditional or emerging fields"
>
> **Alwyn Hunt,** co-founder of The Rookies

086 Community news

The Rookies

Organisers Alwyn Hunt and Andrew McDonald reveal The Rookies, the new face of the CG Student Awards

088 Industry news

Storyboard Pro

Version 5 is released, Maxon considers a licensing shake up for Cinema 4D and BlenRig 5 launches

090 Studio Access

Centroid

The mocap studio famous for its work on *Until Dawn*, *Ant-Man* and more opens its doors to **3D Artist**

094 Social

Readers' Gallery

The latest images created by the **3dartistonline.com** community

To advertise in **The Hub** please contact Simon Hall on **01202 586415** or **simon.hall@imagine-publishing.co.uk**

> The Rookies is the exciting next step in the awards' evolution as the 'Oscars for young, creative minds'
>
> **Alwyn Hunt, Co-founder**

The Rookies starts on 7 March 2016 and accepts entries right up until the end of May 2016

The Rookies rise up

CG Student Awards relaunches with a brand-new name, a focus on education and a new goal of kickstarting the careers of talented young designers, creators, innovators and artists

Formerly known as the CG Student Awards, The Rookies is an annual event founded by Andrew McDonald and Alwyn Hunt. The pair have had careers in the visual effects industry for over 11 years each, working at some of the world's top studios. The Rookies was created to discover and showcase the outstanding talent emerging from higher education facilities and help launch them into careers at studios. Starting on 7 March 2016, The Rookies will accept entries until 29 May 2016.

"Our legacy is from visual effects, animation, and next-gen gaming," Hunt explains. "Having created the CG Student Awards, the largest online awards for creative students (giving away over $900,000 in prizes and 74 paid internships since it was established in 2009), The Rookies is the exciting next step in the awards' evolution as the 'Oscars for young, creative minds'. To kick things off, we have introduced ten additional prize divisions focusing on the most highly competitive artistic industries. We are excited to invite our existing sponsors, new brands, studios and, most importantly, students from around the world to join us and celebrate the next generation of creative minds."

Entrants can submit work to the following categories: architecture, film-making, graphic design, illustration, industrial design, motion graphics, next-gen gaming, photography, robotics, VFX and animation, virtual reality, and web and mobile. Individuals and teams can also enter into Game of the Year, Film of the Year and People's Choice. "We expect fierce competition for the coveted title of School of the Year and are anticipating some awe-inspiring submissions," Hunt reveals. "The world is a pretty exciting place right now, and new career paths are evolving every year. With respect to this, our goal is to help young creatives launch their careers in traditional or emerging fields. Categories from 'Traditional to Tomorrow' allow participants to show the world their depth as creative talents."

To be eligible to enter The Rookies, you must be able to show proof that you have studied or are currently studying at a certified university, school or online training facility between January 2015 and May 2016. "Every entrant that submits work to The Rookies receives an industry-based ranking from The Rookies judging panel. No more wondering how you stack up against your competition and your peers.

Find out directly from veteran professionals about your skills and if you are ready for the challenges of the industry," concludes Hunt.

In conjunction with the rebrand, The Rookies is also launching an education directory in collaboration with leading schools around the world. The directory will enable prospective students to find and research the best schools and courses based on the results of the awards from previous years. "The focus has always been about showcasing the best student talent, but it's about time the educational facilities received the same recognition. The great difference with our directory is that schools will be ranked based on the performance of students as judged by our panel of industry experts each year," said Andrew McDonald, COO of The Rookies.

This year's line-up of prize sponsors include: Dell, Autodesk, Adobe, Wacom, Nvidia, Luxion, RebusFarm, Epic Games, Crytek, Side Effects, Blackmagic Design, Sketchfab, G-Technology, Chaos Group, AMD, Balsamiq, Allegorithmic, IKinema and Vimeo. In total there are 17 studio-sponsored internships available from: Epic Games, Crytek, Warner Bros, Weta Digital, Rising Sun Pictures, Framestore, Double Negative, The Mill, Method Studios, Ninja Theory, River Studio and Framestore VR. Talks are still taking place with The Rookies' main sponsor so expect further announcements before the awards begin.

Key dates to add into your calendar include the launch day, 7 March, with entries closing on 29 May. Judging will take place between 16 June and 11 July. Finalists are announced on 21 June and the winners are revealed 11 July.

Finalists are announced on 21 June 2016 and then the winners are announced three weeks later on 11 July 2016

Real Virtuality combines a 3D environment with a real-life stage set where users are tracked by the Vicon

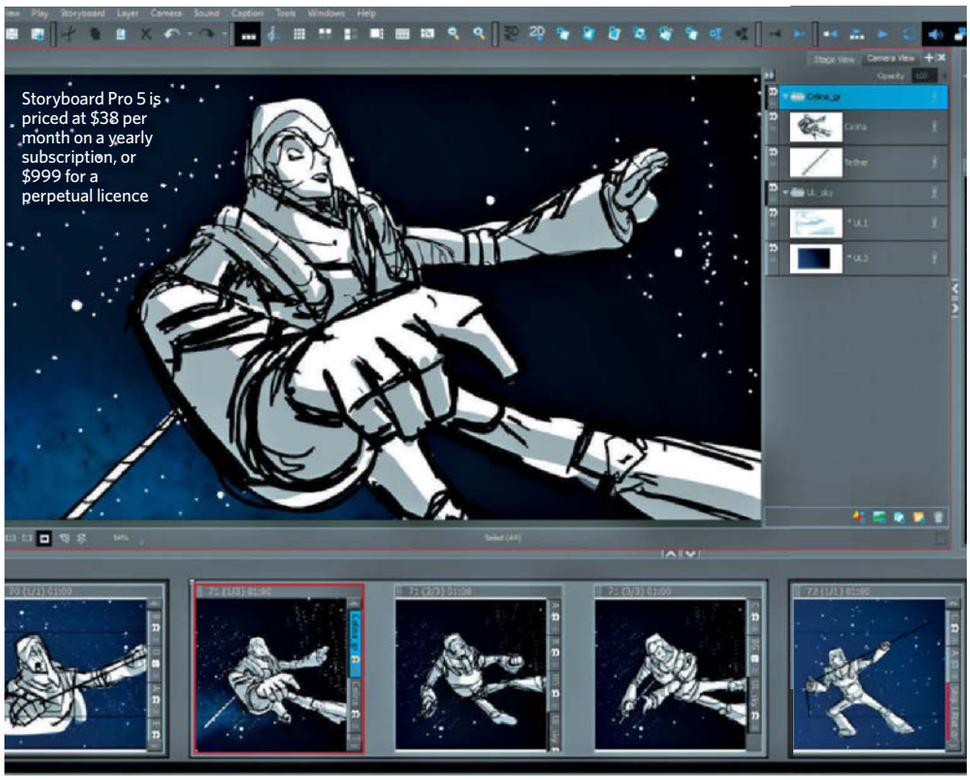
Users' movements match their avatars' movements exactly in the 3D environment

Artanim upgrades Real Virtuality

New partnerships announced at Sundance Film Festival 2016 to strive towards the next era of immersive VR platforms

Artanim, the driving force behind Real Virtuality, the multiuser VR platform, has formed two strategic partnerships for revolutionising the future of immersive-reality technologies and cinema. The partnerships are with Vicon, which specialises in optical motion tracking systems, and the champion of creative stereo 3D films and entertainment, Vision 3. Real Virtuality enables users to become immersed in a VR scene by walking, running, interacting with physical objects and meeting other people with a '*Matrix*-like' degree of immersion.

"Today 3D visualisation is widespread and apparent in nearly every aspect of our lives. We have reached a point where most users aren't aware whether the visuals they 'interact' with are photographs or computer generated. However, the current adoption of monitors, which represent only the 'illusion' of the depth, does not completely satisfy the requirement of an immersive experience. The next big tech leap will come with how we interact with these models and visualise information in space. As technologies devoted to visualisation such as VR will become mainstream in the near future, the final goal will be to deceive the five human senses in a way that the user can believe to live in a real environment," said Dr Caecilia Charbonnier, co-founder of Artanim.



Storyboard Pro version 5 released

The new iteration improves editorial workflow and pipelines for CG, live action and videogame cinematics

Toon Boom Animation's latest release of Storyboard Pro include 3D workflow enhancements, layer grouping, Qt application scripting, support for 23.976 NDF timecode and customisable brush tips. "With Storyboard Pro 5, we are focused on streamlining story development for all types of users," said Marc-Andre Bouvier-Pelletier, product manager at Toon Boom Animation.

Customisable brush tips

You can now create natural-looking, customisable brushes for drawing with. If the preset list doesn't have the brush to achieve the look you're after, you can produce your own in Photoshop, Harmony or Storyboard Pro. There are also settings to edit the roundness, hardness and angle of tips.

"Storyboard 5 enables artists to develop impressive storyboards faster than ever before."

Workflow highlights for 3D include asset snapping to 2D surfaces, enabling artists to block out shots faster. When snapping a 3D asset, your model maintains contact with the surface regardless of changes. Other improvements include drawing layers, which can be created on 3D surfaces for adding 2D drawings to a 3D scene; new Alembic and Collada import options; and built-in FBX conversion when importing to enable quicker scene reloading.

There's also a redesign of the layers list so that you can group layers to reduce clutter and work smarter collaboratively, a boosted layer animation for 2D with multiple keyframe support and support on the timeline for 23.976 NDF timecode gives seamless transfer of animatics from Storyboard Pro 5 to the editing suite. At this frame rate you can directly export to editing suites via EDL, AAF and XM.

Luxion gains fourth patent

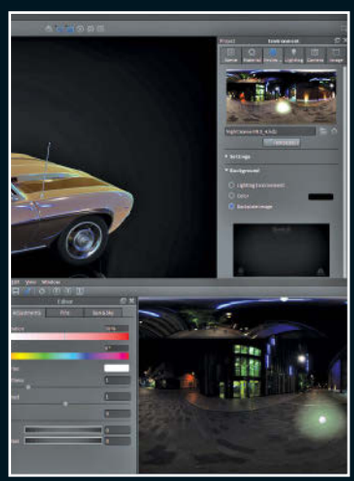
Patent for real-time HDR image editing has been awarded by USPTO

Joining Luxion's existing patents comes a patent for 'live editing and integrated control of image-based lighting of 3D models'. The technology has already been integrated into Luxion's main application: KeyShot 6.

The HDRI Editor in KeyShot 6 will enable users to edit an existing HDR image (which represents omnidirectional, real-world environment lighting) in a scene by adjusting the quality, adding pin lights, using sun and sky parameters, or by creating the work entirely from scratch and seeing the results in real-time.

"Creating, modifying or adjusting image-based lighting has always been difficult in, or disconnected from, rendering software," says Claus Wann Jensen, CEO and co-founder of Luxion. "This solution not only provides a new method for adding and adjusting light, but also provides instant visualisation of the light in the model environment."

Luxion's previously patented technologies include cover material templates for automatic assignment of materials, animation of 3D models using offset transforms and rendering interactive 3D representations.



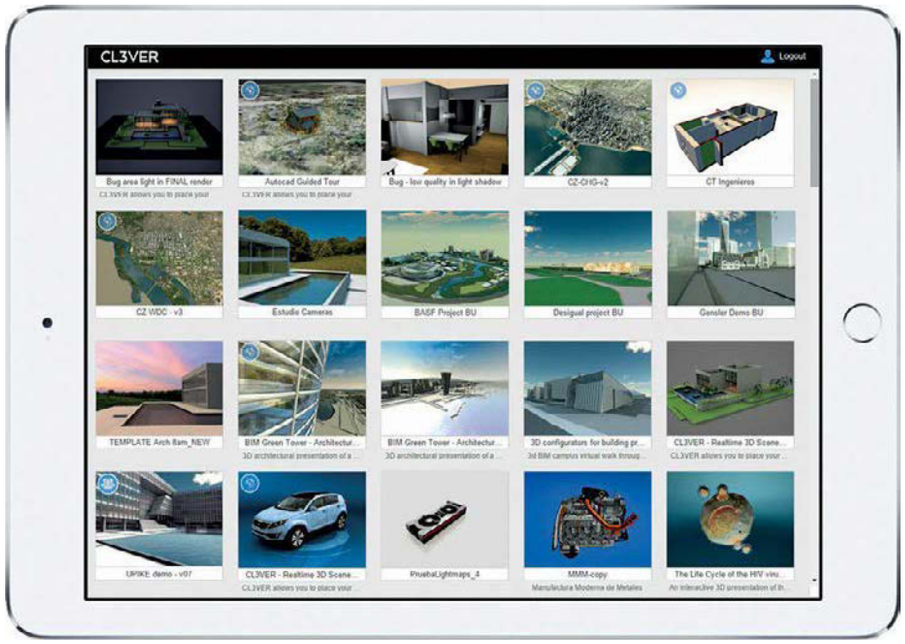
Luxion filed for protection of its HDR image editing intellectual property in March 2012

HAVE YOU HEARD? Landscape tool Terragen 4 is in development and a first look has already been posted online

CL3VER becomes more portable

New app makes 3D presentations available offline on any device

The 3.3 platform release for CL3VER sees a new desktop app, new features and a range of fixes and improvements. CL3VER 3.3 is currently in beta version and but it will replace the offline feature. The desktop app enables you to save interactive 3D presentations on desktop devices. For iOS devices with Retina display and WebGL devices, the optimised viewer makes sure that presentations are accessible from mobile browsers. The beta version has WebVR support, and also works with Oculus VR headsets using Google Chrome. Self-hosting is available by request, and the option of downloading a CL3VER scene as a ZIP is offered. There are also two new interior lights, automatic baking lightmap improvements and more importing options for software like 3ds Max, Revit and Rhino.



The CL3VER app shares the same user interface across PC, Mac OS X and iOS

BlenRig 5 published

Blender Cloud tool provides feature-film quality rigging and an advanced facial system

Released for the first time to the public, BlenRig 5 is a production-tested autorigging and skinning system for Blender. Some of the new features in version 5 include BlenRig Armature, BlenRig Mesh Deform Cage and Lattices, and basic body mesh for low-proxy versions of a biped character – more presets will be released in future. You can download BlenRig for free from the Git repository, but for now all of the documentation is Blender Cloud-exclusive content. Video tutorials and more rigging presets, such as quadrupeds, birds and new facial workflows, are currently in development.

MAXON in licensing shake-up

Plans to address the changing ways that customers purchase and use software

Uwe Baertels, chief financial officer and managing partner of MAXON, has written on the company's blog (bit.ly/1P90LhI) to introduce new licensing options that will be made available to customers for Cinema 4D this year. "While MAXON remains committed to offering a perpetual licence with the security of software ownership, we also recognise that subscription models make it easier for individuals to acquire software and for larger companies to adjust licensing counts to satisfy short-term production needs. Therefore, in 2016, MAXON will be exploring new ways to offer Cinema 4D in a time-limited fashion to satisfy this demand." Still in early stages, there is no information on pricing structures in place yet.

The new global licence program aims to integrate Cinema 4D and BodyPaint 3D licences. Image © Thomas_Dubois

Software shorts

Bringing you the lowdown on product updates and launches

PixelBerg 1.8b

PixelBerg has been updated to fully accommodate the Cinema4D standard render with added support for standard multipass layers and PixelBerg Material Layers. A new Shadow Density option lets you control how much environment ambient and specular lighting is included in the shadows for more dramatic renders.

Lucid Physics

Multiphysics solution newcomer Lucid Physics for 3ds Max simulates fluids, solids, grains, cloth, ropes, gases and soft bodies together in one integrated system driven by Nvidia Flex technology. Running on the GPU, Lucid produces results in an instant, enabling easy interactive adjustments and manipulation of the simulation.

MeshMixer

Multi-material 3D printing has just been upgraded: Complex tools have been added to MeshMixer. You can create Complex objects that have internal partitions (beta), create Complex from Face groups and split Complex to convert a Complex into separate solid shells. The new Unwrap tool lets you unwrap 3D geometry to then laser cut or CNC.

DID YOU KNOW? Videos and materials from Autodesk University 2015's presentations are now available online for free

Centroid Motion Capture

The studio that brought Until Dawn to life examines how mocap will change 3D's future

Description Based at Shepperton and Pinewood Studios, and with bases overseas, Centroid specialises in motion-capture facilities and is currently exploring a range of new platforms to work with.

Website centroid3d.com

Location UK

Project *Little Heroes and Until Dawn*

Client Pampa and Supermassive Games

Contributors Phil Stilgoe, CEO

Software Faceware

Portfolio Highlights

2016 *Max & Me*
2016 *Little Heroes*
2015 *Spectre*
2015 *Terminator: Genisys*
2015 *Mad Max*
2015 *Pan*
2015 *Ant-Man*
2015 *Until Dawn*

© 2016 Foundation Villa del Cine, Orinoco Films and Pampa Films

Comic book characters, cyborgs, mythical heroes... these are just some of the globally recognised characters that Centroid Motion Capture has recently been involved in bringing to the screen, confirming its position as one of the UK's pre-eminent performance capture studios.

With bases at Pinewood and Shepperton Studios, and also in Belgrade and Chennai, Centroid recently completed work on a number of global projects including an Indian film starring Shah Rukh Khan and an animated feature entitled *Little Heroes* from executive producer Nicolas Lidijover. The studio's CEO Phil Stilgoe has been at the heart of Centroid since the late Nineties, and he talks to 3D Artist about current projects and where the studio and the world of mocap is heading next.

20 years ago, the world of motion capture was certainly a new frontier, but today it's a medium that has become an established part of the toolkit for film, TV and videogame production – it has been dovetailing evermore with the broader production process. Stilgoe makes the point that "Mocap's a recognised pipeline now". Indeed, his comment attests to the bigger picture possibilities for Centroid, as it enjoys recognition as one of Europe's principal motion-capture studio facilities with a slate of portfolio hits that currently includes feature films, videogames and animated sports content for online gambling providers.

Stilgoe explains that mocap's application is broadening across platforms because of the realism it can offer. "The location shoot we did last summer of a full-sized basketball court was a European record-breaking capture volume of 35 x 18 x 6 metres (high). Mocap allows for the nuance and precision of athletic effort to be captured."

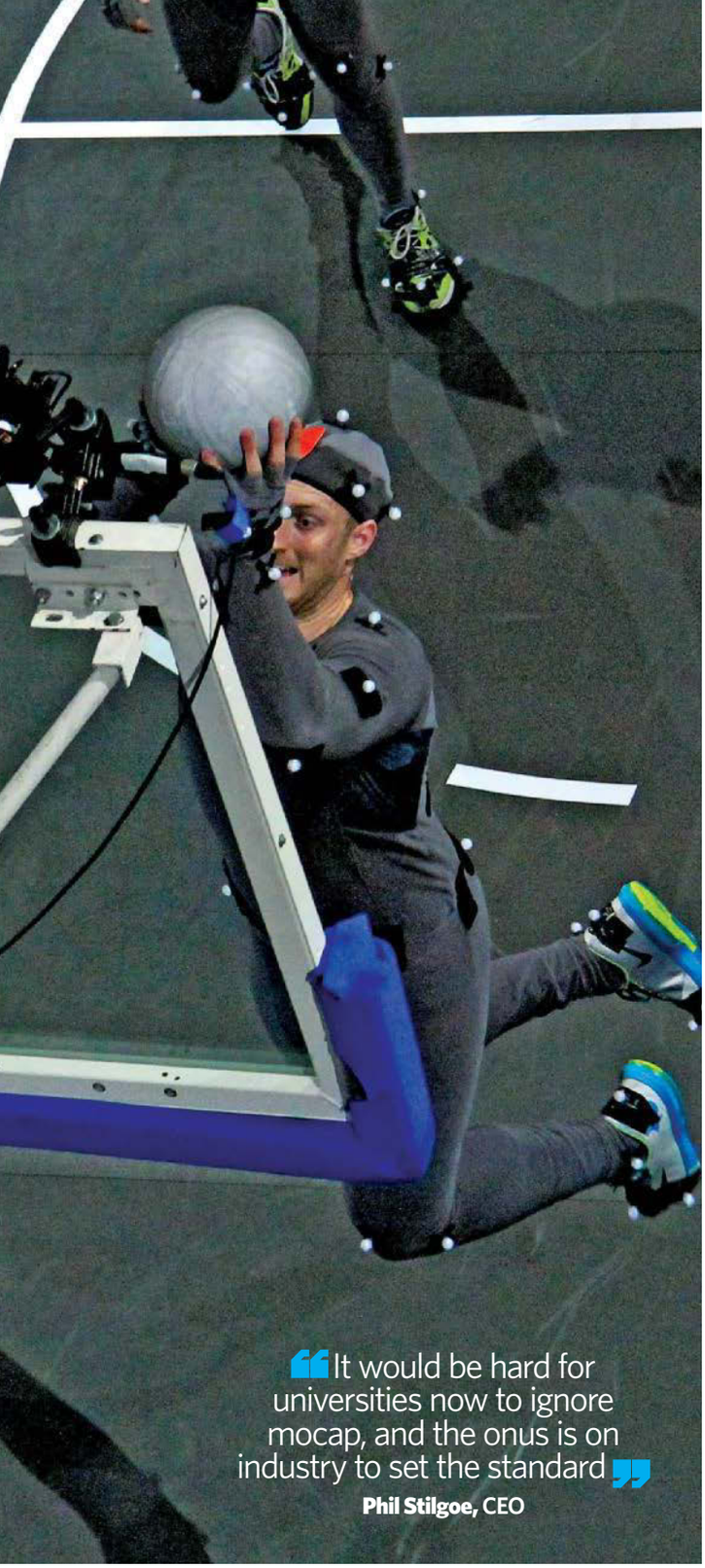
Stilgoe notes that the future for motion capture will certainly focus around the refinements to "The facial side of video-based capture where you start to have live animation streamed from the performer to the character, like a magic mirror." Recently, Centroid worked with Supermassive Games on *Until Dawn*, a horror game for which it provided all of the body mocap. Stilgoe also cites the studio's expansion into animated films: "We were working on *Little Heroes* (animated feature) for which we cast all the actors and supplied the full performance-capture and character-animation pipelines. In [post-production], as well as the usual data cleanup, retargeting and motion editing services, we laid everything out into shots and created all of the crowd and battle simulations. We also provided a full facial solution using Faceware's video analysis and eye-tracking software."

In parallel with its production work, Centroid has recognised the mutual advantage in building connections with education. "It would be hard for universities now to ignore mocap, and the onus is on industry to set the standard."

01

Looking to Centroid's future, Stilgoe reveals that "We're working on our own top secret IP". He also speaks enthusiastically about the possibilities of the new generation of mocap for outdoor and the more obscure location shoots, noting that "only a few years ago that was impossible". He goes on to add that more mo-cap work will also become possible in terms of motion capture and animals, and he excitedly divulges the fact that "We've also started providing content for theme parks, so that's been a new form of film-making. It's an immersive experience."

For Centroid, then, the past 20 years of work at the centre of the British mo-cap industry has brought the company to a point where it will be ready to seize new opportunities in rendering performances. Centroid will be at the forefront at which the human and the digital worlds converge.



> It would be hard for universities now to ignore mocap, and the onus is on industry to set the standard
>
> **Phil Stilgoe,** CEO

02

03

04

05

01 Centroid's work on animated sports content was given a thorough workout on Europe's largest mocap volume to date

02 On the stage, performers enact boxing moves for one of the studio's animated sports data capture sessions

03 Centroid has worked with Supermassive Games on *Until Dawn*, for which it provided all of the body mocap

04 For *Little Heroes*, Centroid captured all mocap data for large and small scale scenes

05 For the *Little Heroes* animated feature, Centroid supplied full performance capture

Dell Precision 17 7000 Series

Regular contributor and visualisation pro Paul Hatton takes Dell's latest mobile workstation tech for a test drive, and discovers how well it fits into his busy work life

Having used several of Dell's workstations in the past I was really excited to get my hands on the new Dell Precision 7710, and will be keeping a project diary for the next couple of months. Dell is describing it as its most powerful mobile workstation ever, so it should be impressive!

With an increasing number of people, including myself, demanding high-end performance on the go, my first tests were to see how it felt as a mobile device. I wanted to make sure that it truly was a mobile device that a user would not only want to work with, but be able to carry around and use on the go. When working I was really pleasantly surprised. The carbon-fibre chassis and slim design meant that it was incredibly light, making holding it and carrying it pretty much pain-free and feasible to use on the go.

This is, however, the 17-inch version so obviously it's not small! Due to the reduced weight though, the overall size is something that I can live with. The impressive screen real estate made my 3ds Max viewports look massive (thumbs up) and my toolbars look tiny (thumbs down), forcing me to learn a few more shortcuts and focus on my model rather than on the interface.

One other thing that users of mobile devices hate is glare! There's nothing worse than having to constantly adjust the screen, or even move location completely, to combat the effects of glare. Thankfully, Dell has taken this into consideration, meaning that I experienced no glare issues while navigating around my scenes. Overall it's been a very pleasing device to interact with.

Once I had gotten a feel for the machine's performance on the move, I wanted to start to put it through its paces and see how the hardware under the hood performed. Using 3ds Max as my tool I set up a scene with well over five million polygons and a complex lighting setup with detailed and highly realistic materials.

One of the things that I noticed was how quickly the scene loaded. This is thanks to the built-in solid state drive (SSD),

CHECK BACK NEXT MONTH FOR PART 2!

AMD FireRender

A path-tracing renderer with a native physically based material system

The FireRender 3ds Max plugin is still in its beta phase so it was difficult to put it through its paces and give a fair comparison to other similar renderers like iRay or Corona. That being said, I love a clean, simple interface and that is exactly what AMD has provided.

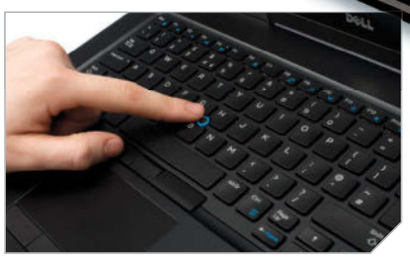
Interestingly, as I ordinarily work with V-Ray materials, I was impressed by the flexibility of being able to use the Corona material converter as FireRender supports Corona materials. This is a big plus for AMD as it looks to try and increase the user base of its render engine.

I also found that it worked seamlessly inside of 3ds Max as a plugin and was pleased that I didn't have to export my scenes to an external program for rendering.

which utilises flash memory (no moving parts) to read and write the data. Saving the scene on an on-going basis was also quick and hassle-free. This type of drive has been a must for me in recent years and it performs well in the 7710, saving precious time when working to deadlines.

I haven't had much of a need so far to use the built-in Dell Precision Optimizer but the specifications claim that application performance can be increased by up to 121 per cent. That's got to come in handy at some point. I'm looking forward to delving deeper into that tool in the coming weeks as I look to push the complexity of my scene and, therefore, push the workstation to its limits.

That it boasts the first Intel® Xeon® processor for mobile workstations and DDR4 RAM also helped to ensure that there were no frustrations in terms of viewport performance. I have been incredibly pleased with my initial experience of the 7710 and am looking forward to pushing it further and delving deeper into some of the other parts of the workstation.

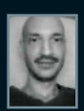


Images of the month

These are the 3D projects that have been awarded 'Image of the week' on 3DArtistOnline.com in the last month

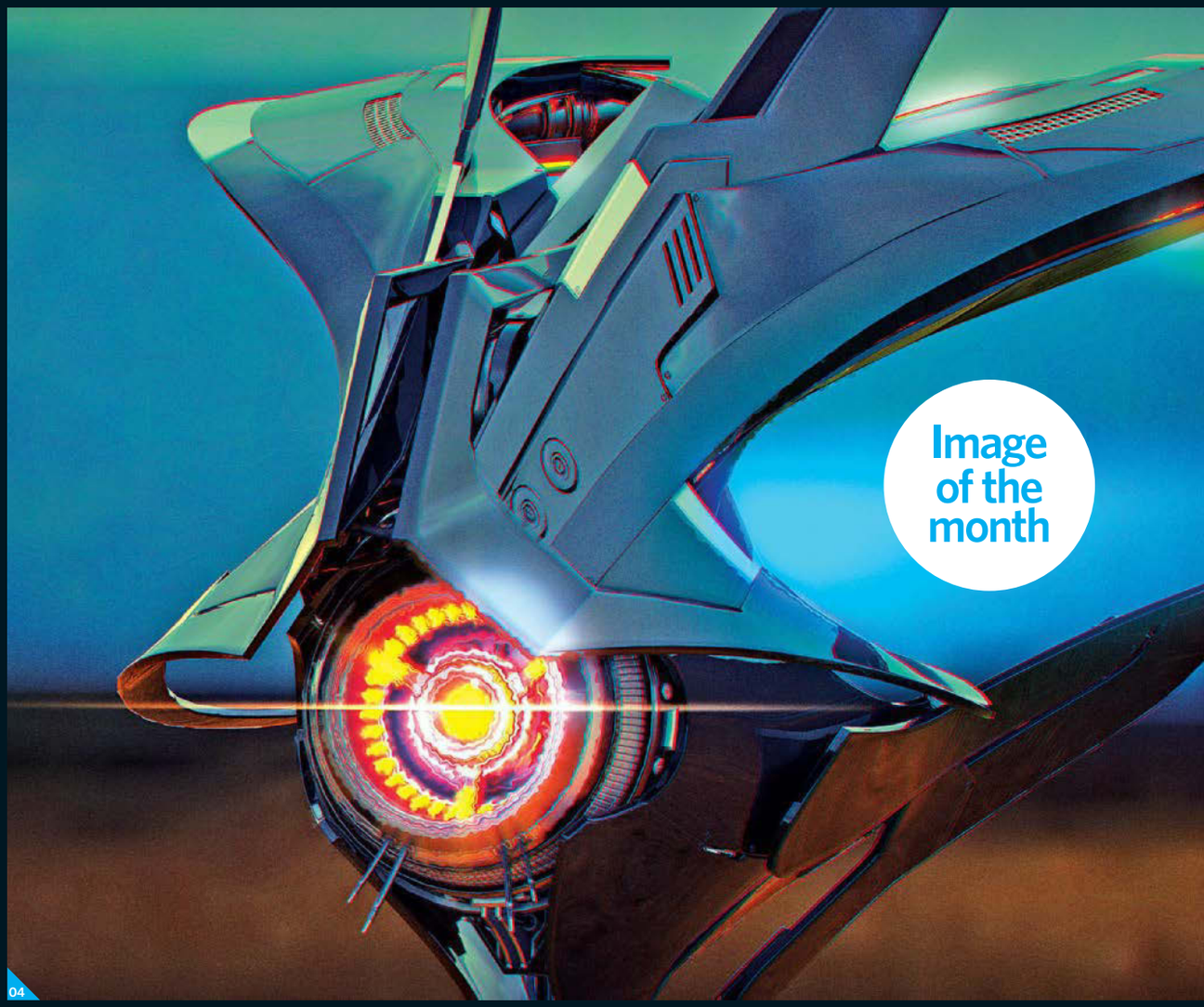
01 David Bowie
by Guzz Soares
3DA username GuzzSoares
Guzz Soares says: "This is a tribute to Starman, David Bowie. For this image I used ZBrush, 3ds Max, Ornatrix, V-Ray and Photoshop."
We say: *We were, like many, saddened to hear of David Bowie's passing back in January. Guzz has paid a wonderful tribute to Aladdin Sane here, imbibing him with a wonderful cartoon style.*

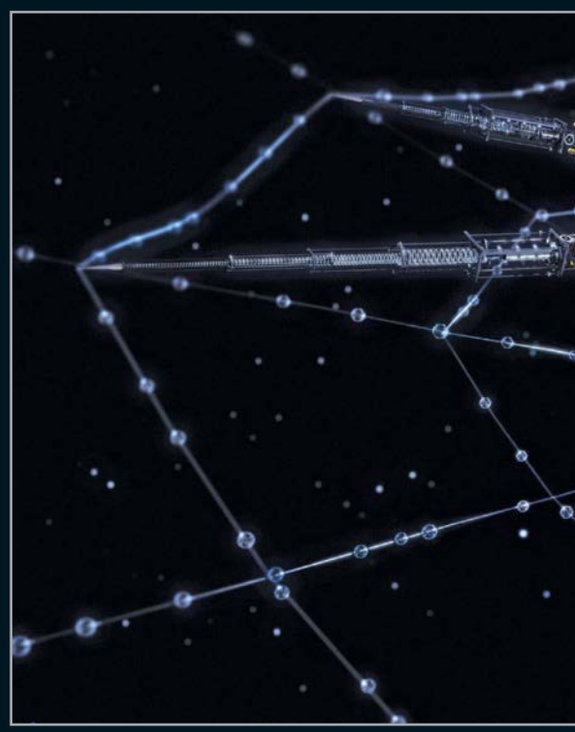
02 Archipelago House
by Radek Ignaciuk
3DA username Radson
Yones says: "The aim of this project was to show all the details. I focused mainly on modelling the trees, and then I used my camera and photogrammetry to create all of the realistic-looking textures that are in this scene."
We say: *This is a really striking architectural design and we love the composition. Radek has done a great job with his textures, and it's nice to see someone getting out and about with their camera, too.*



03 Arachnid Mech
by Hameed Nawaz
3DA username HameedN
Nawaz says: "The very high-poly model and scene was done by me in 3ds Max and rendered with mental ray. It's around 13 million polys, with several million more for the water droplets added at render time. The shape is based, loosely, on that of the black widow spider."
We say: *Hameed has achieved a stunning amount of detail with this project and we really like the crystal-style body at the back. It's fantastic to be able to see all of the little gears and wires holding the spider together.*

04 Scout Drone
by Andrew Hodgson
3DA username AndrewHodgson
Hodgson says: "For this concept I wanted to focus entirely on making an interesting silhouette in Maya. I rendered the final piece in KeyShot and the compositing was done by Josh Parks (joshparks.co.uk)."
We say: *This is a really nice drone idea from Andrew. We especially like the fact that he's utilised smooth curves on the sides – it feels really modern.*





01

03

Balloon Dance **by Behnam Jafari**

3DA username behnam_j2

Behnam Jafari says: "If you are nearby, the balloon will come to you for a dance. This scene was designed in 3ds Max, Photoshop and Lightroom."

We say: *This scene leapt out at us due to Behnam's use of colour. We think hot-air balloons can be really beautiful, and Behnam clearly feels the same. We love the reflections coming up off the water, as well.*

Loki **by Ali Jalali**

3DA username alijalali

Ali Jalali says: "This is a ZBrush sculpt that I did for Nocturna Miniatures in Spain. A mythical, strong pose was the main goal on his figure. I tried to keep the ancient sense in its design as well."

We say: *We like a decent clay sculpt – it's great for showing off the more intricate details on a model. Ali has certainly fulfilled his personal remit of achieving a strong, mythical pose.*

The Runner **by João Alberto Junior**

3DA username João Junior

João Alberto Junior says: "This scene is based on the fantastic concept by Michel Verdu (**behance.net/MichelVerdu**). Modelling was done in Cinema 4D and Photoshop."

We say: *A great pose, wonderful modelling and strong texturing work makes this image stand out. Mech designs don't always have to be angular and serious – there are plenty of brilliant cartoon concepts out there.*

Restaurant **by Vich Nguyen Thanh**

3DA username Vicnguyendesign

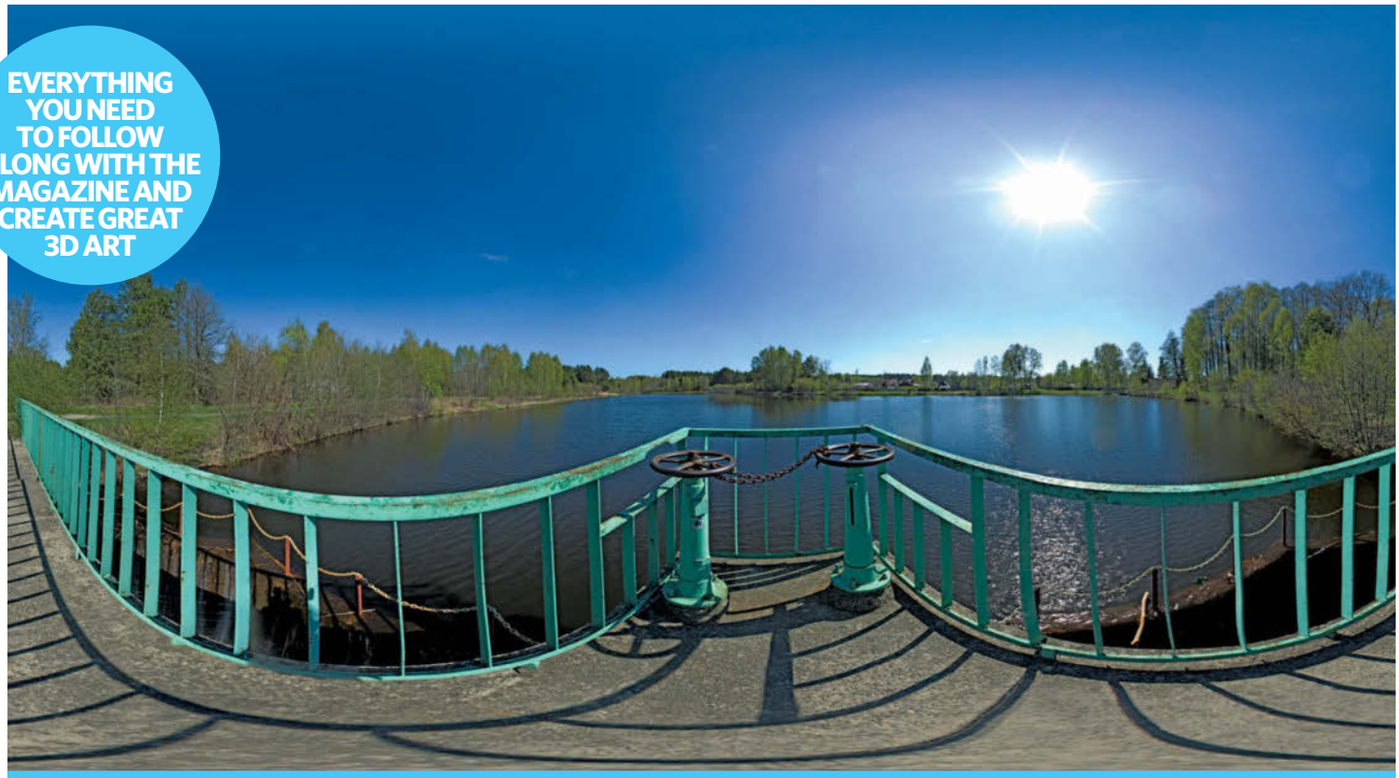
Vich Nguyen Thanh says: "The restaurant is a project in Texas, USA, situated on a vast area. The customer sent me a reference image that they loved. From there, I was inspired. The software that was used included 3ds Max, V-Ray and a little Photoshop."

We say: *Another superb composition from Vich here – it's a really striking image. Nice lighting and a good choice of colours really add to its considerable charm.*

YOUR FREE RESOURCES

Log in to **filesilo.co.uk/3dartist** and download your 3D resources **NOW!**

EVERYTHING YOU NEED TO FOLLOW ALONG WITH THE MAGAZINE AND CREATE GREAT 3D ART



PREMIUM CGAXIS HDR MAPS

THIS MONTH'S COMBINED RESOURCE SIZE: **4GB**

filesilo.co.uk/3dartist

YOUR BONUS RESOURCES

ON FILESILO THIS ISSUE, FREE AND EXCLUSIVE FOR 3D ARTIST READERS, YOU'LL FIND OVER 4GB OF RESOURCES, INCLUDING...

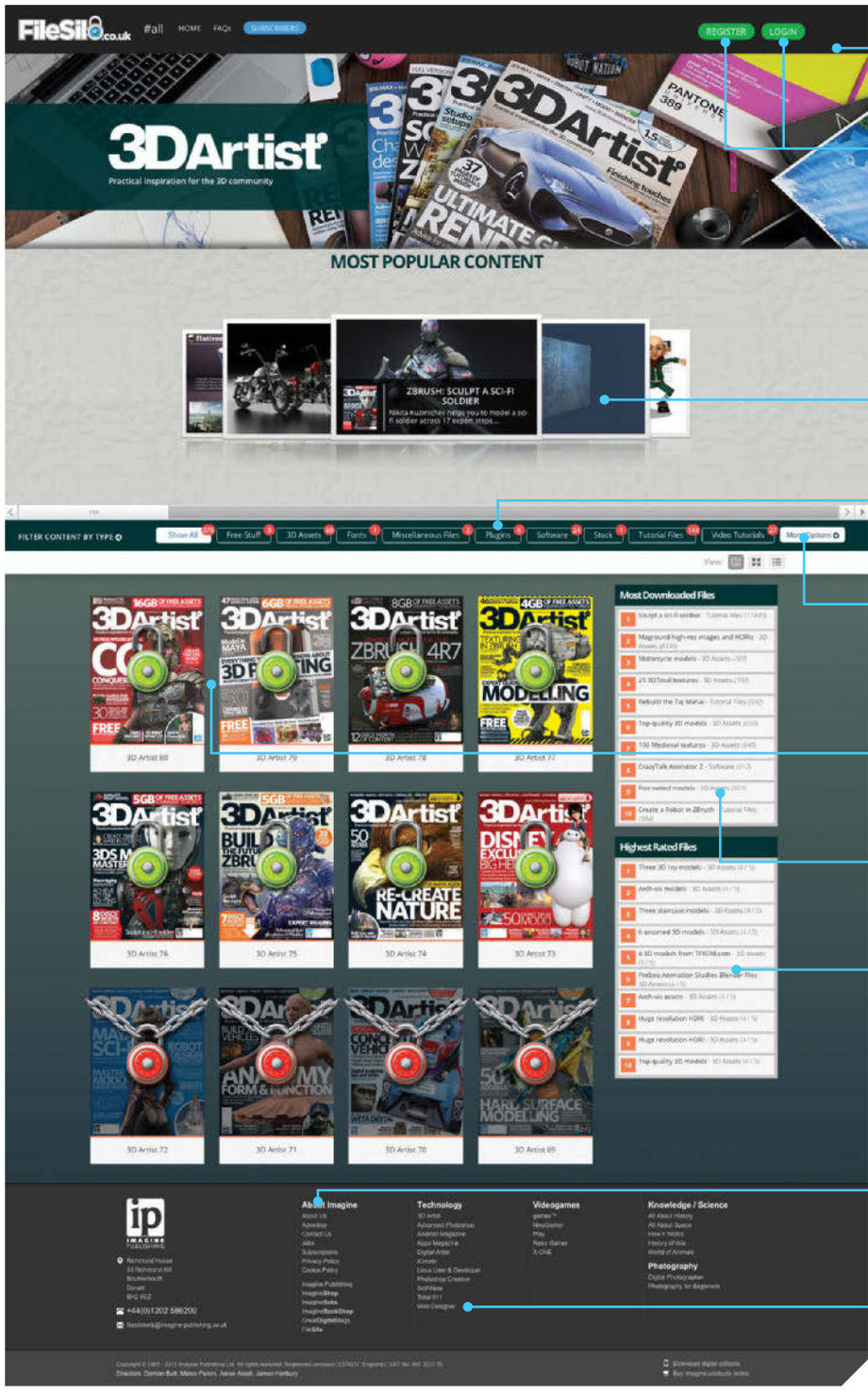
- Huge, premium HDR maps courtesy of CGAxis to use in your work
- Three CGAxis food models
- Hours of quality video tuition from our tutorial experts
- 25 Awesome textures from 3DTotal
- A huge selection of images and scene files from our tutorials

FileSilo

FILESILO – THE HOME OF PRO RESOURCES

Discover your free online assets

- A rapidly growing library
- Updated continually with cool resources
- Lets you keep your downloads organised
- Browse and access your content from anywhere
- No more torn disc pages to ruin your magazines
- No more broken discs
- Print subscribers get all the content
- Digital magazine owners get all the content too!
- Each issue's content is free with your magazine
- Secure online access to your free resources



This is the new FileSilo site that replaces your disc. You'll find it by visiting the link on the following page

The first time you use FileSilo, you'll need to register. After that, you can use your email address and password to log in

The most popular downloads are shown in the carousel here, so check out what your fellow readers are enjoying

If you're looking for a particular type of content, like software or video tutorials, use the filters here to refine your search

Can't find the resource you're looking for in these filters? Click on More Types to specify what kind of resource you want

Green open padlocks show the issues you have accessed. Red closed padlocks show the ones you need to buy or unlock

Top Downloads are listed here, so you can get an instant look at the most popular downloaded content

Check out the Highest Rated list to see the resources that other readers have voted for as the best

Find out more about our online stores, plus useful FAQs such as our cookie and privacy policies and contact details

Discover our fantastic sister magazines and the wealth of content and information that they provide

HOW TO USE FileSilo

EVERYTHING YOU NEED TO KNOW ABOUT ACCESSING YOUR NEW DIGITAL REPOSITORY

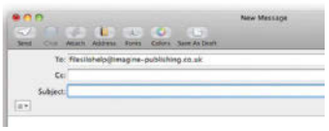
To access FileSilo, please visit **filesilo.co.uk/3dartist**

01 Follow the on-screen instructions to create an account with our secure FileSilo system, and then log in and unlock the issue by answering a simple question about the magazine. You can access the content for free with each issue of 3D Artist.

02 If you happen to be a print subscriber, you can easily unlock all the content by entering your unique Web ID. Your Web ID is the eight-digit alphanumeric code that is printed above your address details on the mailing label of your subscription copies. It can also be found on any renewal letters you receive.

03 You can access FileSilo on any desktop, tablet or smartphone device using any popular browser (such as Safari, Firefox or Google Chrome). However, we recommend that you use a computer to download content, as you may not be able to download files to your phone or tablet.

04 If you have any problems with accessing content on FileSilo, or with the registration process, take a look at the FAQs online or email **filesilohelp@imagine-publishing.co.uk**.



NEED HELP WITH THE TUTORIALS?

Having trouble with any of the techniques in this issue's tutorials? Don't know how to make the best use of your free resources? Want to have your work critiqued by those in the know? Then why not visit the **3D Artist** Facebook page for all your questions, concerns and qualms? There is a friendly community of fellow 3D artists to help you out, as well as regular posts and updates from the magazine team. Like us today and start chatting!

facebook.com/3DArtistMagazine

Issue 92 of **3DArtist** is on sale **23 March 2016** from **GreatDigitalMags.com**

More variety than nature itself: Cinema 4D Release 17

Faster. Easier. More Realistic.

Cinema 4D Release 17 makes the easiest-to-use professional 3D software more efficient than ever before. New tools as well as expanded and completely reworked features help you turn your ideas into reality even quicker and with less effort. The improved workflow helps you meet the tightest deadlines. We've even gone so far as to re-invent the line!

CINEMA 4D
Release 17

www.maxon.net

THE DIGITAL ANIMATION & VISUAL EFFECTS SCHOOL

DAVE SCHOOL

www.daveschool.com

MALUSI TUGWANA
2015 GRADUATE

"If I've learned anything from The Dave School, it would be the value of hard work, determination and the importance of having a strong passion for doing something you love. At the end of the day, coming to The DAVE School was one of the best decisions I've made in my life and I would implore any other aspiring 3D Artist to do the same."

ACADEMIC PARTNER

TO SPEAK WITH ADMISSIONS OR TO SCHEDULE A TOUR, PLEASE **CALL (855)328-3839**
THE DAVE SCHOOL IS LOCATED ON THE BACK LOT OF **UNIVERSAL STUDIOS FLORIDA®** IN ORLANDO.

THE DAVE SCHOOL IS NOT OPERATED BY NOR AFFILIATED WITH UNIVERSAL ORLANDO®